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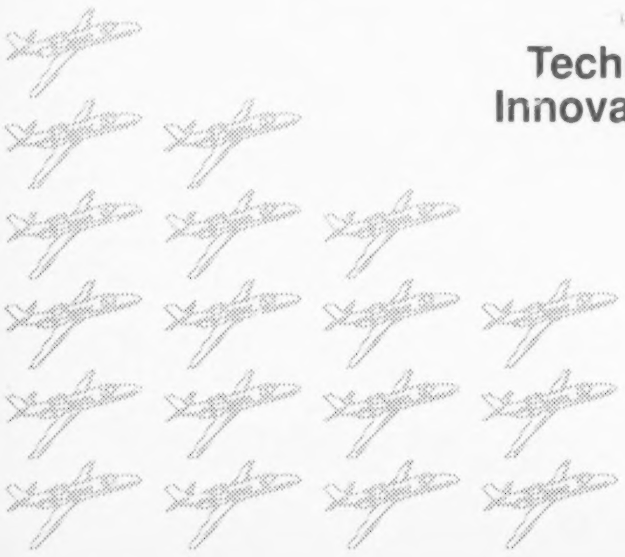

Institute for Public Policy and Business Research, The University of Kansas

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The General Aviation Industry: Trends and Projections 1

Gerald S. McDougall and Dong W. Cho

This year Kansas manufacturers will sell about $1 billion worth of smaller jets and turboprops to businesses that need a fast convenient way to transport owners and employees. Demand for these aircraft appears to be affected more significantly by market forces (e.g. price, interest rates, utilization rates, supply of pilots) than by structural changes like deregulation of commercial airlines or elimination of the federal investment tax credit.

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M. Elizabeth Stella and Anthony Redwood

Survey responses from 309 Kansas manufacturing and advanced technology businesses show that in their own industries 83 percent are not at the cutting edge of technology and that most either cannot predict technological change at all or their ability to predict is only fair. Respondents, especially those involved in advanced technology businesses, indicated that the resources of universities and colleges could be used to help them meet the challenges of changing technology.

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A model for technology transfer in Kansas is based on the authors' examination of the survey results reported in the previous article, existing data comparing Kansas with other states, technology transfer programs in other states, the capacity and willingness of Kansas universities and colleges to undertake technology transfer, and ongoing liaison programs in Kansas.

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The General Aviation Industry: Trends and Projections

Gerald S. McDougall
Dong W. Cho

Dr. McDougall and Dr. Cho are professors of economics and faculty associates of the Center for Aviation Research at Wichita State University.

> *The general aviation industry is undergoing structural changes . . . If this phenomenon is occurring then falling prices, operating costs, and real interest rates, accompanied by economic growth, may not be sufficient to revive the market.*
>
> *Federal Aviation Administration Report*
> *March 1989*

> *I would certainly agree with the statement that the general aviation industry has undergone structural change. There is no question about that. However, I would strongly disagree with the FAA analysis as to the nature of this change.*
>
> *Edward W. Stimpson*
> *President*
> *General Aviation*
> *Manufacturers Association*
> *March 1989*

Introduction

The comments above speak to the tumultuous economic times in the general aviation industry and point to the significant disagreement concerning the nature and causes of change in the general aviation industry and the prospects for its future. The following discussion attempts to provide insight into the more significant changes within this important Kansas industry.

The general aviation industry produces aircraft for various types of flying: recreational and personal flying with piston driven aircraft, general aviation business flying with turbine aircraft (which includes turboprop and jet aircraft), commercial air operations (e.g., cargo and regional air commuters) with specialized turbine aircraft, and military flying. Our discussion concentrates on business flying; that is, the general aviation market for turboprop and jet aircraft that usually seat from eight to twenty-one people such as the Cessna Citation V, the Learjet 31, Beech Super King Air, and the newly developed Beech Starship. This article focuses on the business aircraft market because

1) Kansas general aviation firms concentrate most on the business aviation market;
2) the market for piston aircraft has significantly diminished in the past decade;
3) the military market is much narrower and unique in its procurement behavior; and
4) many industry participants believe the business aircraft market will be the growth center for the industry, especially in terms of national exports, revenues and technological advances.

The major general aviation manufacturers in Kansas (Beech, Cessna, and LearJet) currently employ approximately ten thousand people and export (out of state) aircraft worth approximately $950 million. Turbine aircraft (general aviation turboprop and jet aircraft) account for approximately 90 percent of billings, or $900 million.

Though the precise impacts of Kansas general aviation manufacturing on the state economy are difficult to measure, they can be estimated using the various impact multipliers derived from the Kansas Long-Term Model.[1] For example, total general aviation related employment in Kansas is estimated to be 22,000, including both part-time and full-time jobs. It is further estimated that the export of general aviation aircraft from Kansas generates almost $2 billion in total new sales statewide, and approximately $550 million of additional state income. Though these are best interpreted as rough approximations, they clearly identify the role general aviation activity plays in Kansas economic development.

The sections that follow present an historical overview of industry activity; a simple model of the general aviation industry market; and a brief discussion of economic factors that seem to be correlated with the expansions and contractions in demand for new business aircraft. The analysis necessarily is sketchy, but references to more detailed sources are listed at the end.

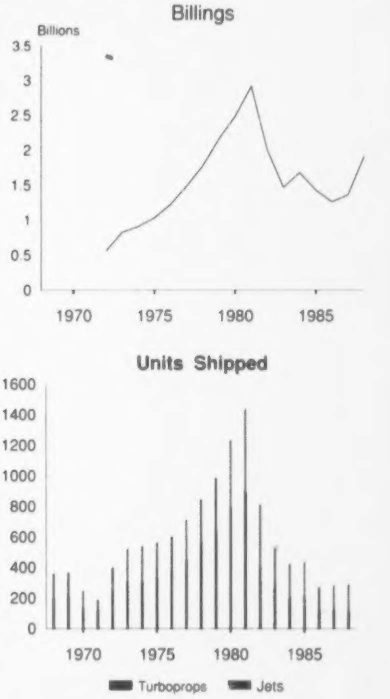
Although there is evidence of structural shifts described by the Federal Aviation Administration (FAA), statistical analysis suggests that changes in prices, interest rates, profits, and aircraft operation costs explain a great deal of what has happened in the general aviation industry over the past twenty years. This conclusion, which is consistent with the General Aviation Manufacturers Association (GAMA) perspective, is encouraging since it implies that manufacturers and public policy officials can positively affect the fortunes of the industry.

The prospects offered are necessarily speculative, intended to suggest where the general aviation industry may be headed, and indirectly, what its ability to contribute to continued economic development of the state may be.

Industry Activity

As Figure 1 shows, over the past twenty years the general aviation industry in the United States has emerged from its embryonic stage and gone through a cycle of tremendous growth and nearly cataclysmic decline.[2] During the good years, 1968 to 1981, growth in the number of turboprops sold averaged 12 percent a year, and for jets

Figure 1
U.S. General Aviation



Source: General Aviation Manufacturers Association quarterly reports and *Business Aviation*.

average annual growth was 9.5 percent. But the years since 1981 have been lean ones, and by 1988 turbine output had fallen 80 percent and jet output had fallen 68 percent from the 1981 peak. Since 1986, however, business jet sales have improved.

Billings have followed a similar pattern, except that between 1986 and 1988 billings increased sharply due to increased shipments of larger, more expensive jets like the GulfJet IV, which sells for around $18 million.[3] Kansas general aviation manufacturers account for 50 to 55 percent of GAMA billings, so Kansas general aviation manufacturers billed approximately $950 million in 1988.

Though a consistent time series of employment data is not available, newspaper reports suggest that commensurate growth and decline took place in employment over this period as firms first expanded then shut down product lines, adjusted their engineering staffs, and eventually consolidated entire plant operations in response to the post-1981 downturn. For example, Russ Meyer, Cessna chairman and CEO was recently quoted as saying that Cessna's employment had dropped from 15,900 in 1981 to 3,900 by mid 1989.[4] This would suggest the trough in general aviation direct employment occurred around 3,000, representing an 80 percent decline in employment associated with the fall in aircraft shipments.

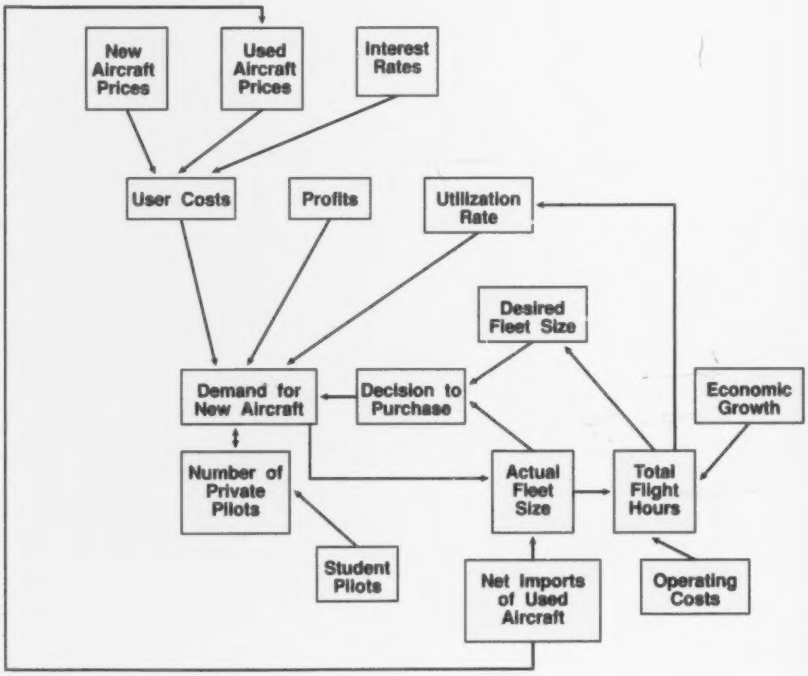
A Simple Industry Model

The stylized model of the general aviation industry shown in Figure 2 provides a framework for sorting through the possible explanations for the changes in general aviation production, employment, and earnings. Because of the feedback mechanism between the size of the general aviation fleet and the demand for new aircraft, there is no obvious starting point for putting the model in motion. It is convenient, however, to consider two sides of the purchasing decision.

On one side is the macro-level investment decision to make a purchase, which involves a comparison between the actual size of the general aviation fleet and the desired size: if the desired fleet is larger that the actual one, an investment decision is made to purchase a new aircraft. Factors important in this segment of the model include total flight hours and net imports of used aircraft, which in turn are affected by economic growth and aircraft operation costs.

On the other side is choice of a particular aircraft, which is influenced by corporate profits and the aircraft utilization rate, user costs of new and used aircraft, and the number of private pilots. Manufacturer's purchase price, the price of used aircraft, and interest rates have their influence through user cost.

Figure 2
Model of the General Aviation Industry



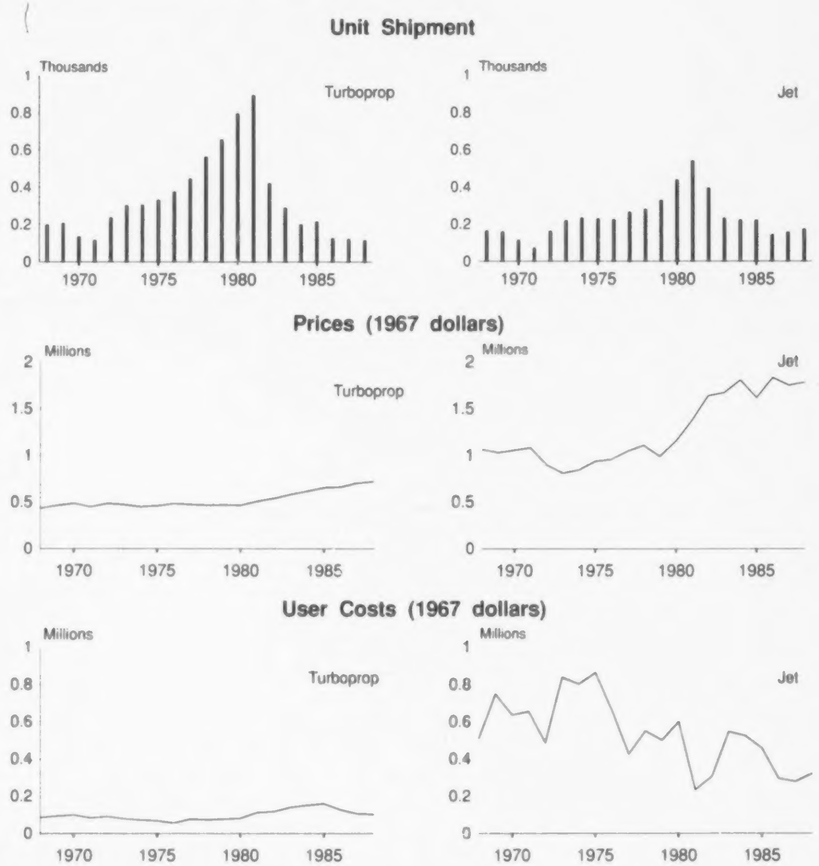
The purchase of new aircraft feeds into the existing fleet, of course, completing the circle.

There always is a complex set of interactions that eventually generate a given market outcome, but the market described is somewhat unusual in two aspects. First, general aviation aircraft have very long lives, and there is little replacement demand. While recent data show that the average age of aircraft in the active fleet is approximately twenty years, industry representatives do not anticipate any significant replacement demand for at least another ten years. Even then replacement demand will be relatively modest given the age profile of the active general aviation business fleet. For these reasons the model does not contain a replacement demand component.

The second unusual characteristic of this market model is that training and licensing requirements for pilots affect pilot availability and the demand for general aviation aircraft. In the long run, pilot training and licensing costs influence the relative attractiveness of general aviation air travel compared with commercial air travel, while the pool of licensed pilots in part defines the long-run potential market for many general aviation aircraft.

Formal studies of the general aviation industry have focused on the demand for new turbine aircraft with emphasis on changes in user costs and profits; factors affecting aircraft utilization rates with emphasis on the role of operating costs, and the interaction between new aircraft demand and total flight hours. The sections that follow summarize the most important information and results from these studies.

Figure 3
U.S. Sales for Turboprops and Jets



Unit Shipment

Prices (1967 dollars)

User Costs (1967 dollars)

Source: ***Aircraft Bluebook Price Digest*** **and** ***Marketline*****, both published by Intertec, Overland Park, Kansas.**

Changes in Turboprop and Jet Prices

Basic principles tell us that price significantly affects unit sales, and this is reflected in the importance most firms place on developing appropriate pricing strategies for their products or services. Like most businesses, general aviation turbine aircraft manufacturers adhere to the principle that price matters. Expressed in 1967 dollars, the average price of a general aviation turboprop aircraft in 1968 was $434,600, and since then this average has trended upward. By 1988 the average real price of business turboprops reached $722,505, which corresponds to a 2.5 percent annual real increase over the twenty-one-year period. Much of the total increase in turboprop prices, however, occurred after 1980, which correlates with the dramatic decline in turboprop shipments after 1981.[5]

The pattern is similar for new jets. In 1968 the average price of a general aviation jet aircraft was $1.06 million, but this value increased to $1.81 million by 1984. Since 1984, however, there has been no significant change in real average jet price. Over the entire period real jet prices have increased at an average annual rate of 2.6 percent.

As noted above, general aviation aircraft are very long-lived, so it is not appropriate to interpret the purchase price as the annual cost of owning a turboprop or jet aircraft. It is more appropriate to calculate user cost or the annual opportunity cost of owning an airplane. A reasonable approximation for user cost is the total of annual interest payments for the purchase plus depreciation as reflected in used aircraft prices. For example, suppose an airplane costs $1 million, the interest rate is 10 percent, and the aircraft loses 15 percent of its value each year. The interest cost is $100,000 ($1 million × 0.10) and the depreciation cost is $150,000 ($1 million × 0.15). The sum of the two is user cost, which is $250,000 or ($100,000 + $150,000) in this example.

Real jet user cost has trended downward over the period, while real turboprop user cost has trended upward. Since changes in interest rates and used aircraft prices are embedded in user cost, user costs display greater variability around trend than do purchase prices. Over the entire period real turboprop user cost increased at a 1 percent annual rate, while real jet user cost declined at an average annual rate of 2.3 percent.[6]

In Figure 3 trends in turboprop and jet shipments are contrasted with trends in prices and user costs to provide a snap-shot of the role of price changes in determining shipments of turbine aircraft. Though most obvious in the turboprop market, there is a clear pattern of increased shipments in years with declining prices or user costs and decreased shipments in years with increasing prices or user costs. In fact, more detailed statistical analysis has demonstrated that the demands for new turboprop and jet aircraft are very sensitive to changes in user cost including changes in purchase prices of new aircraft. Results reported elsewhere suggest that a 1 percent increase in user cost results in a 1.5 percent decrease in turboprop shipments and a 0.8 percent decrease in jet shipments. These effects suggest that a 1 percent change in purchase price, working through user cost, results in a 3 percent decline in turboprop shipments and a 2 percent decline in jet shipments.

Statistical analysis also reveals that changes in after-tax corporate profits and prices of used aircraft influence the demand for new turbine aircraft. Nonetheless, the most important determinant appears to be user cost and through it purchase price. Together changes in user costs and after-tax corporate profits explain more than 90 percent of the variation observed in jet and turboprop shipments.

Aircraft Utilization

Despite declining annual shipments, Figure 4 shows the active fleet of general aviation turbine aircraft grew substantially during the period examined. Between 1968 and 1988 the turboprop fleet increased from approximately 1,285 aircraft to 5,300 aircraft (7.7 percent a year on average). Because jet technology is relatively new and jets supplanted some turboprop applications, the active jet fleet grew faster than the turboprop fleet. The jet fleet increased from 356 aircraft in 1968 to about 1,600 aircraft in 1988, averaging 8.2 percent per year. Growth in the active fleet has slowed dramatically since 1984, however, and the size of the turboprop fleet has even declined slightly. This is partly because while the dollar was low and prices were soft, Europeans and South Americans bought up used U.S. aircraft.

As the turbine fleets grew, total flight hours increased, but at a rate lower than the fleet size. Between 1969 and 1988 jet flight hours increased at an 8.2 percent annual rate, while the jet fleet grew 8.4 percent. Over this same period, turboprop hours increased 6.5 percent annually and the turboprop fleet grew 7.7 percent annually. Currently, therefore, the business aircraft fleet of turbine aircraft is used less intensively than in the past. Average flight hours for turboprop aircraft increased from 377 hours to 515 hours between 1969 and 1976 and then fell to 363 hours in 1988. Average jet hours increased from 537 hours to 662 hours between 1969 and 1972 and then fell to 433 hours in 1988.[7]

Fleet growth with declining aircraft utilization suggests current active aircraft are under-utilized. In fact, according to historic average utilization rates, the current turboprop fleet could fly 400 thousand more hours, and the current jet fleet could fly 300 thousand more hours. These potential flight hours are equivalent to 700 turboprop airplanes and 600 jet airplanes.

It is only natural to presume that the presence of this excess capacity in the active fleet has decreased demand for new aircraft. Some preliminary analysis suggests a relationship between flight hours and aircraft demand: a 10-thousand-hour increase in total flight hours is associated with a six unit increase in turboprop shipments and a seven unit increase in jet shipments. Of course, these estimates presume there is little excess capacity in the existing fleet to absorb any increased demand for air travel.

Factors important in determining aircraft utilization include relative operating costs and the level of economic activity. Unfortunately for general aviation manufacturers, deregulation of commercial air travel reduced commercial air fares, and economic growth has been modest. Under these conditions it is unlikely that substantial increases in aircraft use and total fleet hours will be observed in the near term.

Student and Private Pilots

A major long-term concern in the general aviation industry is the declining pool of private pilots and student pilots shown in Figure 5. Recall that between 1974 and 1979 both turboprop and jet markets grew substantially as well as the market for piston driven aircraft. At the same time the number of private pilots and students increased significantly. But many of the private pilots trained during World War II are retiring from active flying, and aircraft manufacturers are concerned that nobody is taking their places.

In 1974 there were about 306 thousand private pilots, and the number increased to 357 thousand by 1980. Since then however, the number of active pilots has declined to about 300 thousand, 2 percent fewer than in 1974. The number of student pilots peaked at more than 210 thousand in 1979. Between 1974 and 1987 the number fell from 181 thousand to 146 thousand.

Although statistics show that the average student completes the requirements for a private pilot certificate in four to six months,[8] no one knows precisely what student-to-pilot ratio is needed to maintain the pool of active pilots. Nonetheless it is clear that both the pilot pool and the student-to-pilot ratio are declining, and these simultaneous changes will restrict the long-run potential market for many general aviation aircraft.

Structural Changes

For the most part changes discussed to this point reflect basic market forces rather than fundamental changes in the structure of the general aviation industry and the behavior of buyers and sellers. Nonetheless, there have been some external changes that could be categorized as structural shifts: the deregulation of commercial air travel and the elimination of the investment tax credit. Each of these is properly interpreted as permanent rather than transitory change, and each fundamentally alters the background conditions for the general aviation industry. Surprisingly, studies undertaken so far suggest that these changes have affected the turboprop market only, leaving the business jet market undisturbed.

Though not readily apparent in the annual data, examination of quarterly shipment data for turboprop aircraft reveals a distinct and significant positive shift in the relationship between price and demand in 1979. Though it is difficult to identify the specific causes, the shift occurred at the time of the air traffic controllers' strike, implementation of deregulation in commercial air travel, and OPEC action in world oil markets. These events disrupted commercial air operations and carried uncertain long-term consequences for the availability and quality of commercial air service; effects which tend to increase the relative attractiveness of general aviation travel and induce an increase in demand for turbine aircraft. The effect of the shift persisted through 1985, though unit sales declined in response to continuing increases in turboprop user cost.

In 1986 a nearly equal downward shift appears in the turboprop market, re-establishing the demand for turboprop aircraft at its pre-1979 level. Again, the exact cause of the shift is uncertain, but it did coincide with the elimination of the federal investment tax credit.

Whatever the causes, two structural shifts in the turboprop market are identifiable, and they appear with equal magnitude, but of opposite sign. In contrast, in the jet market deregulation and changes in tax laws had no discernible effect on the relationship between price and demand, which has been rather stable over a twenty-year period.

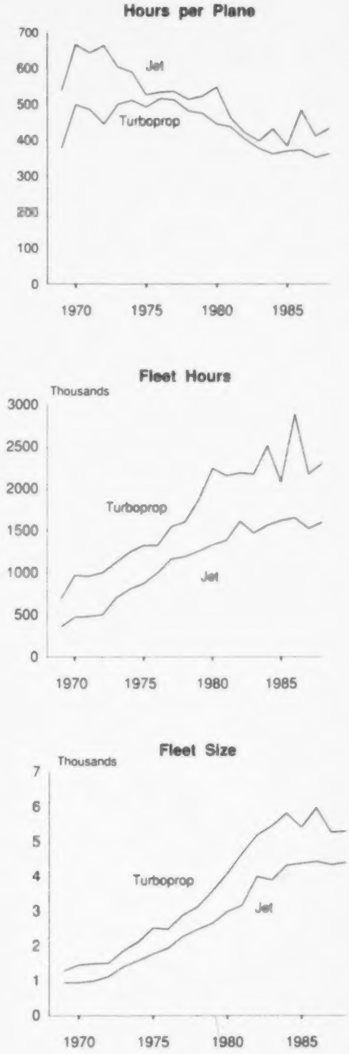
Prospects for the Future

Apparently, rather than indicating structural changes, current conditions in the turboprop and jet markets reflect basic economic forces put into play by changes in prices, interest rates, and operating costs. Sales increased when user costs declined, and sales decreased when user costs increased. Changes in user cost can be explained by changes in purchase prices of new and used aircraft and changes in interest rates. Prospects for the general aviation industry are brighter than if current conditions mirrored a fundamental restructuring in market structure or market behavior. There is no evidence that tastes and preferences have changed away from general aviation flying.[9] Instead, it appears that buyers of general aviation business aircraft reduced purchases in recent years in response to cost increases.

Since interest rate changes and prices of used aircraft are beyond control of the industry, an improved future for general aviation depends in part on manufacturers' ability to manage real price increases. To the extent price changes reflect changes in costs, and given rather established technology, the key may turn with controlling product liability expenses. Between 1977 and 1985 total liability costs for the industry increased from approximately $24 million to $118 million, in real terms. This 390 percent real increase has pushed up new aircraft prices and brought piston aircraft production to a near standstill. Under current laws general aviation manufacturers' product liability extends indefinitely into the future and over the entire fleet. This is particularly burdensome because aircraft are so long lived and most planes produced are still flying. Senator Nancy Kassabaum and Representative Dan Glickman have proposed legislation to establish national liability standards and limit manufacturers' liability to a fixed period of time. Whether or not the legislation will get out of committee is uncertain, but there appears to be sufficient floor support for passage in both houses of Congress if it does.

Since there are under-utilized aircraft in the active fleet, however, capping real price increases will not immediately increase sales. Corporate fleet operators are managing the use of their general aviation aircraft better so that even though general aviation air travel is increasing they will not have to buy new aircraft.

Figure 4
Fleet Size and Utilization



Source: *Statistical Handbook of Aviation* published by the Federal Aviation Administration, Washington, D.C.

Although we do not discuss them in any detail here, other issues must be addressed by the general aviation industry. The issue of airport access also has been raised as the national air traffic system becomes more congested and major airports confront an increasing number of delays in moving commercial air traffic. Efforts to constrain, limit, or prohibit general aviation access to major airports stalled when an administrative law judge ruled that such action discriminates against smaller aircraft and interferes with interstate commerce. Nonetheless, the issue is not settled and is going forward on appeal. The solution to airport congestion resides with increased investment in new airport facilities and advanced air control systems, not with banning a few general aviation aircraft from urban airports.

The cost of certifying air worthiness has increased substantially and the general aviation industry is trying to work with the FAA to devise a regulatory and certification process that will not only ensure safe general aviation flying but also provide for a reasonable climate supporting research and development of new technologies. As one example of the problem, the certification of the Beech Starship recently was delayed (possibly until November 1989) as additional tests of its electronic systems are conducted to determine their sensitivity to radar interference from defense installations. The broad certification question likely will remain an emotional issue, however, as public concerns about air safety, aircraft design, and maintenance are heightened by the question of the aging fleet of commercial airliners and the recent series of major commercial aircraft accidents.

Despite the many unresolved issues and the problem the industry faces in checking price increases, there are some positive signs on the horizon for the general aviation industry. The industry simultaneously is addressing the utilization and pilot issues through the General Aviation Market Expansion Plan (GAME Plan). This marketing and education effort is supported by a consortium of industry participants, and is intended to increase fleet utilization by educating the corporate world about the availability and advantages of general aviation business flying. The focus is both on the benefits from ownership and use of a corporate airplane, and on the availability and cost of general aviation flight services through charter companies and fixed-base operators. A second component of the GAME Plan is informing the general public of the practicality of learning to fly and of how to get started working toward a private pilot's license.

General aviation manufacturers and suppliers also are investing in developing new products, more efficient engines, and advanced aircraft components. A few examples have already been mentioned including the Citation V, the Learjet 31, the Beech Starship, and the GulfJet; another is the Piaggio Avanti pusher-prop. Engine manufacturers are working on quieter, more fuel efficient engines, but current sales levels do not warrant major new expenditures on engine development at this time, especially when it takes five years to develop new designs and technology. It can be expected that new electronic technologies will filter down from commercial aviation. One specific example of this process is the *glass cockpit*--instrument displays on the cockpit windshield, found in more expensive general aviation aircraft. On the more mundane side are new paints that will drastically reduce damage to airframes from corrosion. All of these are intended to improve the cost effectiveness of new aircraft purchases by extending the range, performance, and other capabilities of the general aviation turbine aircraft.

Then there are the economic aspects that have been emphasized in this discussion. Interest rates are edging downward and used aircraft prices are rising. Average used jet prices increased approximately 30 percent and used turboprop prices increased about 21 percent between February 1987 and May 1989. Jet user costs are declining, while both turboprop and jet utilization are increasing. As expected, shipments of new jet aircraft are responding to these changes and increasing.

In addition, new products have been introduced both in the turboprop and jet markets. While the success of the new Cessna Citation V in the jet market seems assured, the turboprop all-composite Beech Starship is still an unknown quantity. Its advanced composite technologies and sophisticated avionics may very well have a prolonged positive effect on general aviation sales extending beyond the turboprop market.

The composition of general aviation sales will likely continue to shift toward jet aircraft and away from turboprop aircraft, as corporate buyers respond to changes in relative prices, operating costs, and aircraft performance.[10] In 1978, two turboprop aircraft were sold for every jet. This ratio has changed so that now for every two turboprops, three jets are sold.

To the extent the sales-composition ratio continues to change in favor of general aviation jets, billings will grow faster than unit sales. Currently Kansas general aviation manufacturers account for approximately 50 to 55 percent of industry billings, suggesting that Kansas firms will bill more than $1 billion in 1989. As industry conditions improve, therefore, general aviation production should continue to be a significant source of manufacturing employment for Kansans and export income for the state.

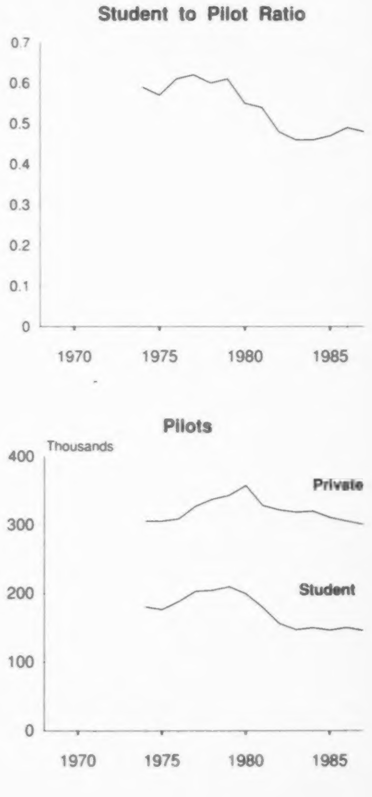


Figure 5
U.S. Supply of Pilots

Source: *General Aviation Statistical Databook*, General Aviation Manufacturers Association, Washington, D.C., 1988.

Notes

1. David Burress, "Economic Impact Multipliers for Kansas," p. 3.

2. Although piston aircraft are beyond the scope of this article, it is interesting to note that their market has been at least as volatile. Piston shipments increased from 6,697 in 1962 to 17,032 in 1979 and fell to 700 by 1987. The trainer segment of the piston market seems to be showing signs of recovery in 1989, however.

3. Billings reported by GAMA include data from Beech Aircraft Company, Cessna Aircraft Company, and LearJet, all members of the association.

4. *Wichita Business Journal*, August 28, 1989, p. 13.

5. Between 1980 and 1988, real turboprop prices increased 55 percent, a 6.5 average real annual increase.

6. The decline may be somewhat overstated because the price component of the user cost series had to be adjusted to account for quality changes to specific models (e.g., a larger more efficient engine). Nonetheless, while turboprop user cost has trended upward, jet user cost has fallen or remained stable.

7. Representatives from the National Business Aircraft Association report increased aircraft utilization among their members suggesting that business turbine utilization is beginning to trend upward.

8. *Learn to Fly*, General Aviation Manufacturers Association, 1989.

9. Although it is sometimes said that big decreases in sales mean piston aircraft are outmoded, the limited available evidence indicates that user costs just got too high. The recent increase in piston shipments supports the latter contention.

10. The development of the GulfJet by Gulfstream Corporation as a 'low end' business jet to compete with new business turboprops is an example of the change taking place.

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Technology Transfer Problems Facing Kansas Industry: A Survey of Kansas Manufacturing Firms

M. Elizabeth Stella
Anthony Redwood

Dr. Stella is a research associate at the Institute, and Dr. Redwood is a professor of business and executive director of the Institute for Public Policy and Business Research.

Introduction

Recent studies show that businesses that do not keep up with technology run a greater-than-average risk of failure.[1] Thus competitiveness of a business or of the state economy as a whole depends in part on its use of technological innovation. Many countries and states have recognized the importance of technology by establishing mechanisms for transferring technical information from its source (for example, research laboratories, professional journals, and industry leaders) to businesses. Commonly, these technology transfer mechanisms draw on the higher education system for technological and related management resources and expertise.

In light of the importance of technological innovation, we surveyed Kansas businesses about technology issues. Questionnaires mailed to manufacturers and advanced technology firms covered aspects of technology leadership that research has shown to be significant: businesses's ability to predict change and keep up with innovations in their industry, and the availability of workers with the technical expertise to implement change.[2] The survey included questions on technology needs, the manner in which those needs are currently met, and how linkages with higher education might help.

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Methodology

Two surveys were mailed to Kansas firms in November and December 1988. The surveys were designed to assess businesses' need for technical and business/managerial assistance. The following questions were addressed:

1. What problems are Kansas firms having in technical and managerial areas?
2. Is the impact of changing technology and technical innovation forcing changes in types of technology used?
3. To what extent and in what ways are firms using academic institutions to identify and solve technical and managerial problems?
4. Do Kansas firms wish to use academic institutions to identify and solve technical and managerial problems?

Two groups were surveyed: manufacturing firms and advanced technology firms. Advanced technology firms differ from others in that they rely upon people with technical skills (even for entry-level positions); employ more engineers and scientists; use newer technology; grow faster; and are more successful in the international marketplace.[3] Advanced technology firms include manufacturers as well as service industries (e.g., computer software developers). Manufacturers and advanced technology firms were surveyed because of their importance to the state's economic development and their need to keep abreast of technological changes to remain competitive.

The sample of 640 manufacturers was drawn from the Kansas Department of Commerce's *Directory of Kansas Manufacturers and Products*. These businesses received the Manufacturer Survey. An additional 642 businesses were identified through lists of advanced technology or research and development firms. They received a second survey, the Survey of Kansas Advanced Technology Firms, which included questions from the Survey of Kansas Manufacturers plus several more.

A total of 156 (24 percent) questionnaires were returned by manufacturers and 153 (24 percent) were returned by advanced technology firms. Of those advanced technology firms who returned the survey, 40 percent were manufacturers, 40 percent provided business services, and the remaining 20 percent were neither manufacturers nor business service providers.

Results

Description of Respondents

Thirty-six percent of the manufacturers and 93.5 percent of the advanced technology firms were located in metropolitan areas. Manufacturers had been in operation longer (median - twenty-five years) than advanced technology firms (median - nine years). Sixty percent of the manufacturers and 64 percent of the advanced technology firms employed fewer than twenty-five persons.

Most advanced technology firms employ people with technical skills: 65

Table 1
Problems for Businesses

Start-up Problems for Advanced Technology Firms	% Scoring Moderate to Major Problem
Developing new product and/or service	53
Planning market strategy	52
Finding qualified technical and professional staff	52
Commercialization of product	49
Obtaining financing	49
Analyzing markets	46
Finding qualified managers and executives	45
Finding other qualified employees (not technical, professional, managerial)	44
Process development and control	41
Coping with government regulations	39
Preparation/use of business plan	35
Developing/managing an accounting control system	35
Setting and implementing goals	31
Establishing a banking relationship	31
Personnel management	25
Systems maintenance	15

Current Problems for Manufacturers	% Firms Scoring Moderate to Major Problem
Coping with government regulations	62
Finding qualified employees	51
Planning marketing strategy	50
Analyzing markets	46
Developing new products	40
Developing new or improving existing technology	40
Upgrading current products/services	34
Adopting existing technology	25
Process control	25
Preparation, use, update on a business plan	25
Setting and implementing goals	25
Managing personnel	22
Systems maintenance	20
Obtaining financing	20
Obtaining, implementing, and managing accounting and control systems	18

Table 2
Firms' Ability to Predict Technological Change

Percentage of Manufacturing Firms

		By No. Employees		By Location	
Ability to predict	Total	<25	≥25	Metro	Nonmetro
Can't Predict	19	16	3	5	13
Fair	34	20	14	12	22
Good	33	13	20	12	21
Excellent	11	3	7	6	5
NA	4	3	1	1	3

Percentage of Advanced Technology Firms

Ability to predict	Total	<25 Employees	≥25 Employees
Can't predict	7	6	1
Fair	18	10	8
Good	45	27	18
Excellent	29	21	9
NA	<1	<1	0

percent employ technicians, 63 percent employ scientists and engineers, and 43 percent employ data processors. The largest group of workers in advanced technology firms is scientists and engineers, who are 23 percent of advanced technology firm employees. Although technically skilled workers may be crucial to manufacturing firms as well, technicians are only 9 percent of the manufacturing workforce, and scientists and engineers are only 2 percent.

Types of Problems Experienced by Kansas Firms

Table 1 shows how advanced technology firms characterized problems that they experienced during early development (start-up) phases. More than half of the advanced technology firms responding had moderate to severe problems with product development, planning marketing strategies, and finding qualified technical and professional staff.

The problems shown in Table 1 are of course interrelated. For example, difficulty in finding qualified technical and professional staff would lessen a firm's ability to develop new products, analyze markets, and plan a market strategy.

Such problems can seriously lessen a firm's ability to survive in competitive, technology-driven industries, and the survey reveals several cases in point. The founder of a northeast Kansas software company noted that he would probably have to move the firm to California because he could not find experienced technical staff in Kansas. Other entrepreneurs said they had had to sell their companies because they could not afford the marketing analysis necessary to position their product, or they could not afford to design and mount the advertising campaigns necessary to launch products.

Table 1 also shows current problems reported by Kansas manufacturers. The most common problem is coping with government regulations, and about half have trouble finding qualified employees and planning a marketing strategy.

One manufacturer described the spectrum of problems faced in finding qualified employees as ranging from difficulty in finding well-trained, motivated apprentice craftsmen to an inability to afford design engineers. Another problem was the cost of machine tools. A small machine shop owner reported that he could not afford to buy new state-of-the-art machine tools, so he purchased used equipment instead. He reported they were not competitive with such an approach, but had no other options. Others described their struggle to maintain and improve their markets by diversifying and expanding sales and marketing efforts. Their capacity to expand markets, however, was often limited owing to lack of resources like knowledge, time, and financing.

When asked to describe their own level of technology, less than half of the advanced technology firms described themselves as leaders in innovation, and only 42 percent considered themselves at the cutting edge of technology. Few

Table 3
Technological Impact Expected by Manufacturers in the Next Five Years

Percentage of Manufacturing Firms Responding

Area of Impact	Great	Considerable	Some	Little	None	Don't Know
Processes and process control	16	29	28	15	6	7
Products	11	30	34	15	4	6
Materials	10	21	37	24	7	5
Information needs	10	36	35	9	5	6
Employee skill level	8	29	42	13	3	5

Impact on Process and Process Control

Level of Impact	% Metro Firms	% Non-Metro Firms	% Firms <25 Employees	% Firms ≥25 Employees
Great	7	9	5	11
Considerable	13	16	13	15.5
Some	9	19	14	13
Little	1	13	11	3.5
None	1	3.5	5	<1
Don't know	4	3	6	1

Chi-Square 11.325
DF 5 $p<0.0453$

Chi-Square 16.734
DF 5 $p<0.005$

Table 4
Changes Currently Occurring in Manufacturing Industries

Type of Change	% Firms Reporting Change in Their Industry	% Firms Reporting Change in Their Firm
Technology Changes	71	62
Computer aided design	49	32
Computer aided manufacturing	42	25
Automated material handling	35	19
Computer integrated manufacturing	22	8
Computer aided engineering	20	10
Robotics	14	8
Technical Systems	69	62
Computerized accounting systems	52	37
Total quality control	28	21
Statistical process control	25	17
Just in time production methods	21	12
Zero defect planning	14	6
Human Systems	51	47
Higher levels of decision making at shop-floor level	33	28
Self managing teams	21	15
Work cells	7	7

Table 5
Barriers to Implementing New or Existing Technology

Barrier to New Technology and Technical Systems	Percentage of Firms Advanced Technology All	Young*	Mfg.
Lack of financial resources	44	52	28
Lack of technical expertise	25	26	19
Lack of skilled workers	18	20	15
Risk too high	17	13	12
Lack of engineers	14	15	11
Lack of technical information	12	13	9
Lack of managerial commitment	11	8	9
Other	10	6	11

*Young advanced technology firms are those that have been established within the past fifteen years.

manufacturers (18 percent) characterized themselves as at the cutting edge. Most reported they were current (46 percent) or were potentially out of date (37 percent). Out of all 309 respondents, 83 percent believe they are *not* at the cutting edge of technology in their industry. According to recent studies, these are the manufacturers who are operating at a significant disadvantage with respect to technological competition and have a higher risk of failure.[4]

Their situation is even more precarious since many report that they have difficulty predicting or anticipating technological change. As Table 2 shows, over half of manufacturers responded that they have very limited prediction capabilities: 19 percent reported they cannot predict, and 34 percent say they have only a fair ability to do so. Businesses with fewer than twenty-five employees and nonmetropolitan manufacturers were most likely to have difficulty predicting technological change. Small firms may be less able to afford access to technical personnel (e.g., engineers, consultants) or information sources (e.g., technical meetings) where technological change and predictions are discussed. Nonmetropolitan firms may suffer from geographic isolation, making it less likely that they would have access to technical personnel or information sources.

On the other hand, Table 2 shows that most advanced technology firms reported good to excellent technological prediction capabilities. This held true for large as well as small (<25 employees) firms.

Table 6
Technological Change Expected by Manufacturing Firms Within Five Years

Likelihood for Change	Percentage of Firms All	Metro	Nonmetro	<25 Empl.	≥25 Empl.
Very likely	43	17	26	17	27
Somewhat likely	39	12	27	26	13
Somewhat unlikely	9	4	5	7	2
Very unlikely	0	0	0	0	0
Not likely	8	2	6	7	1

Chi Square=16.803
DF=3 $p<0.0008$

The greater percentage of scientists and engineers in advanced technology firms undoubtedly contribute to their ability to predict technological change. It may also account for their pace of innovation. In the next two to three years, 67 percent of the firms plan to develop new products, and 50 percent plan to change the mix of their products and services. Research and development budgets that average 18 percent of gross income help fund product innovations. Only 21 percent report no research and development budget at all. A majority (56 percent) of manufacturing firms do not have a research and development budget. The combination of low research and development activity and lower-than-average numbers of scientists and engineers in Kansas' manufacturing workforce may be important, since the ability to innovate or implement existing technology is correlated with number of scientists and engineers in the working population.[5]

Manufacturers were asked to estimate the impact of technology on their firms. Table 3 shows that many expect considerable impact in the areas of process, product, materials, information, and employee skill level.

Small (fewer than 25 employees) and nonmetropolitan manufacturers may be underestimating impact. These groups predicted less technological impact in process and process control than larger and metropolitan manufacturers (Table 3). Statistical analysis of these results indicated that the actual percentages in each category differed significantly ($p<0.0453$ and $p<0.005$) from chance occurrence.

Table 4 shows that most manufacturers reported changes are currently occurring in their industry in technology (71 percent), technical systems (69 percent), and human systems (50.5 percent). The types of changes most frequently reported were computer-aided design (CAD) and computer-aided manufacturing (CAM), computerized accounting systems, and higher levels of decision making at the shop floor level.

The differences between the percentage of firms reporting industry change and those reporting change in their own firm indicate that not all firms are implementing changes occurring in their industry. For example, 71 percent report technological change is occurring in their industry, but only 61.5 percent report making changes in technology in their firm. That leaves about 10 percent who are not implementing changes occurring in their industry.

Lack of utilization of new technology is not entirely because of lack of technology information. Many firms (42 percent of manufacturers and 55 percent of advanced technology firms) responded that they have identified but not implemented some form of new technology or technical system. While 25 percent of manufacturing firms and 27 percent of advanced technology firms reported no barriers to introducing new technology, others cited lack of financial resources and lack of technical expertise as the main obstacles to technology implementation (Table 5). These problems were acute for young advanced technology firms--those that had been in operation fifteen years or less. Despite the barriers faced in implementing technology change, 78 percent of advanced technology firms said that they are very likely to make changes in technology used in the next five years.

Table 7
Level of Interest in Assistance Available at Academic Institutions

Type of Assistance	% Firms with Great/Moderate Interest Advanced Technology	Mfg.
Technical		
Improve current products, processes	71	No Data
Identify and assist with problems	69	38
Access to labs, equipment	45	29
Computer access to libraries	67	33
Technological Innovation		
R&D for new technology, products, processes	67	38
Business/Managerial Assistance		
Identify and assist with problems	57	37
Training		
Technical training	69	55
Management development training	63	50

Table 8
Assistance Regarded as Very/Extremely Beneficial During Early Development Phases by Advanced Technology Firms

Access to	% Advanced Technology Firms
Business professionals regarding market research & planning	43
Business professionals regarding financial planning/management	40
Business professionals regarding advertising & promotion	40
Business professionals regarding preparation/use of business plan	38
Business professionals regarding starting a business	32
Library or computer searches	32
Technical consultants regarding preparation of grant proposals	32
Technical consultants regarding new or existing technology transfer	30
Technical consultants regarding new product development, including technical research	26
Technical consultants regarding product analysis/improvement	24
Technical consultants regarding commercialization of products	22
Scientific instruments and equipment	21
High powered computers	18
Business professionals regarding personnel management	18
Technical consultants regarding products and/or manufacturing processes	17
Business professionals regarding inventory control	13

Most manufacturers also reported that technology change in their firms is very likely (43 percent) or somewhat likely (39 percent) within the next five years (Table 6). Again, small and nonmetropolitan manufacturing firms were more conservative in their estimation of the likelihood for change. The percentages occurring in each category of small and large firms were significantly different ($p<0.0008$) than what would be expected by chance.

Solutions to Problems

As our results show, Kansas businesses compete in changing technological environments. Many reported that they plan to implement or update the technology they use in the next five years. What information sources will guide decisions regarding these changes? Although the majority believe they have adequate information (advanced technology, 79 percent; manufacturing, 81 percent), many are interested in decreasing their dependence upon equipment manufacturers, magazines/journals, and sales representatives as information sources. They would like more scientific and technical information from colleges and universities. This shift may reflect an interest in receiving more objective up-to-date information, which would help create a competitive edge.

Firms were also interested in other resources available from academic institutions, such as information, technical expertise, skills training, and research that would increase their technical advantage in key problem areas (Table 7). More than half of the advanced technology firms indicated great or moderate interest in technical assistance that would enable them to improve products and processes. Almost the same percentage were interested in assistance with problem identification,

Table 9
Academic Services of Greatest Interest

	% Firms With Great to Moderate Interest	
Access to	Advanced Technology	Mfg.
State-of-art science & technology to improve current products & processes	71	NA
Training programs to improve employee technical skills	69	55
Technical expertise to facilitate technical problem identification & assistance	69	38
New technology, products, processes research & development	67	38
University libraries for computerized information retrieval &/or networking	67	33
Management development training	63	50
Business/managerial expertise to facilitate business/managerial problem identification & assistance	57	37
Labs & equipment	45	29

computer access to libraries, research and development, and training. More than half were interested in assistance with business/managerial problems. More than half of the manufacturers indicated great or moderate interest in technical and management development training for their employees. Thirty-eight percent showed interest in assistance with identification of technical problems and research and development for new technology, products, and processes. Business and managerial assistance was also important to 37 percent of the manufacturers.

To solve problems common in start-up phases, advanced technology firms indicated business/managerial and technical assistance would be extremely beneficial (Table 8). Various types of business assistance ranked above technical assistance during early development phases. Access to business professionals regarding market research and planning, financial planning and management, advertising and promotion, and preparation and use of a business plan was important.

A majority of advanced technology firms (53 percent) reported using academic institutions in the past five years. However, 74 percent of these firms would seek more assistance if it were available. Fifty-two percent indicated they would like a liaison office to help them contact academic institutions. Less than half of the manufacturers surveyed (37 percent) used academic institutions in the past five years. However, 64 percent said that they would seek more assistance if it were available. Preference for making the initial contact was divided between those who wished to make their own contacts (41 percent) and those who wanted assistance from some sort of liaison office (42 percent).

Respondents were asked their level of interest in a range of academic services that would help resolve business problems and at the same time be compatible with the academic mission. Access to state-of-the art technology, technical and business/managerial consultation, research and development, training, and information dissemination were services of interest (Table 9). Academic institutions could provide these services if proper networks were developed for easy access.

Conclusions

Kansas firms face considerable challenge in predicting technological changes, identifying technology appropriate for their needs, obtaining resources (technical, managerial, and financial) to implement technology, developing new products, planning marketing strategy, finding qualified employees, and coping with government regulations. The combination or interaction of these challenges may create a climate of technological uncertainty that could seriously hamper Kansas firms' ability to be competitive. Technological uncertainty and financing difficulties appear to retard the rate at which new technology is implemented. These technological and business difficulties, arising in part from the unusually low number of scientists and engineers in the Kansas workforce, could be mitigated by using resources of colleges and universities.[6] Academic institutions are seen as possible sources of assistance, but barriers (e.g., lack of expertise, lack of awareness of business problems, difficulty in making contacts) exist that hamper utilization and further retard technology transfer. Results of this survey suggest that the state of Kansas needs a mechanism that would support and improve technology transfer and business-managerial assistance to Kansas businesses by providing better linkages with institutions of higher education.

Notes

1. Dewar, "Adopting New Manufacturing Technology," 1988.

2. Dewar, 1988.

3. Pennsylvania Department of Commerce, 1985.

4. Dewar, 1988.

5. Williams, "The Direct and Indirect Role of Higher Education," 1986.

6. Dewar, 1988.

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A more detailed description of the surveys and data is presented in **Technology Transfer and Industry Liaison for Kansas Economic Development, *Report No. 161, Institute for Public Policy and Business Research, University of Kansas, Lawrence, Kansas 66045.***

Technology Transfer to Foster Innovation and Competitiveness in Industry: A Model for Kansas

Anthony Redwood
M. Elizabeth Stella
Thomas Lewin

Dr. Redwood is a professor in the School of Business at the University of Kansas and executive director of the Institute for Public Policy and Business Research. Dr. Stella is a research associate at the Institute. Dr. Lewin is an associate professor of History and of African and African American Studies.

In the long run, the survival of Kansas industry in this era of rapid technological change and of the global economy will depend on the state's ability to innovate and to adjust competitively to its changing environment. The objective of a technology transfer and industry liaison program is to enhance business innovation, gestation, and competitiveness, and hence survival by developing and improving access to new and existing technology.

The following study describes a comprehensive model of technology transfer and liaison between higher education and the private sector for Kansas. The special science and technology capabilities of the state's higher education system are linked with the particular needs of Kansas industry for technical support to create an optimal system.

The model accounts for the fact that the Kansas Technology Enterprise Corporation (KTEC) has already implemented programs that have some elements of technology transfer and university/industry liaison: Centers of Excellence, applied matching research grants, small business innovation research matching grants, research equipment acquisitions, and a seed capital program for new technology-driven firm start-ups. These programs, however, are geared largely to enhancing pockets of research that have commercialization potential and to supporting selected advanced technology start-ups with high potential. They were not designed to be a systematic and broad-based program of technology assistance to scattered small- to medium-sized Kansas industry.

Procedures

To develop an appropriate model for technology transfer and industrial liaison for Kansas, we examined special characteristics of the state and researched efforts by other states. First, we assessed the needs and capabilities of Kansas industry and higher education. We mailed questionnaires to manufacturing and advanced technology firms to discover what kinds of technology they need, how their needs are currently met, and how linkages with higher education could help. Concurrently, using interviews and existing data comparing Kansas with other states, we assessed the capacity and willingness of Kansas universities and colleges to undertake technology transfer. We also assessed the nature and effectiveness of existing liaison programs.

Second, we examined and evaluated approaches that other states have taken to enhance industry innovation and competitiveness through technology transfer and liaison. Indiana, Iowa, Ohio, Pennsylvania, and Virginia were selected for intensive on-site review. They were chosen from among the many programs we examined for several reasons: their programs have already been in place for some time, they represent diverse approaches to technology transfer, they have tended to be the more successful, and their business and economic environments are in some ways similar to ours. Structured interviews and on-site visits to these programs were made to identify and evaluate factors that underpin successful higher education-industry linkages for technology development and assistance. This research provided key lessons for the formation of a model for Kansas.

Key Characteristics of Kansas

A workable and effective model for Kansas must take into account the unique characteristics of Kansas, its private sector and its higher education institutions.

First, there are very few federal and private research institutions and laboratories in Kansas. The higher education system is essentially the only accessible in-state source of technology development and knowledge in the state. Consequently, the state has no choice but to develop a system that is anchored in the universities and colleges.

Characteristics of Kansas Higher Education

An obvious limitation to a system based on public higher education is the chronic underfunding of the primary education mission of Kansas colleges and universities. This has important economic development implications: special programs for industry liaison will not be productive if the basic quality of the institutions is itself inadequate and if the institutions are overwhelmed or preoccupied with this larger problem.

Generally in higher education institutions we did not find a tradition of research and development and technology transfer interaction with the private sector. Although this situation has improved significantly in the past few years, interaction is fragmented and intermittent.

Still there is evidence of higher education's growing acceptance and commitment to working with business.

Technology transfer and technical assistance are, however, part of the mission and capacity of Pittsburg State University and the Kansas College of Technology. They could serve as focal points in a technology transfer/technical assistance program, although their capacities are not well known around the state. Community colleges are better known by businesses in their regions, but usually their capacity in science and technology is very limited. Enough exceptions exist to support a regional approach to a technical assistance program.

Kansas post-secondary institutions function with a high degree of individual autonomy, and they have shown limited propensity for inter-institutional cooperation. These factors constitute a significant challenge to cooperation and to the formation of effective consortia. Furthermore, many of these institutions are far from Kansas's economic and population centers.

Characteristics of Kansas Business

The economic performance of Kansas industry has not been strong in this decade of global competitiveness and rapid technological change. Employment growth and net business formation, for example, have persisted at rates that have been chronically below the U.S. average in this decade. The manufacturing sector has been struggling in the face of intense overseas competition. The problem is particularly severe for scattered rural industry. Furthermore, the creation of new firms, including technology driven enterprises, has lagged behind national averages, especially in rural areas. The need for support and assistance could be described as acute.[1]

The preceding article, which describes the results of the Institute's 1988 survey of Kansas manufacturers and advanced technology firms, reveals barriers to competitiveness that are common to many businesses. Kansas industry largely comprises small- to medium-sized firms. Smaller firms often do not have the capacity or resources to undertake research and development or even to participate jointly in technology development. Kansas businesses have difficulty in predicting technological change, and they lack technical expertise. Market research and planning, financial planning, and finding capital are all problems for Kansas businesses.

The Institute's survey showed that Kansas firms would like academic institutions to help them with many of these problems. They would like academic institutions to provide

- access to state-of-the-art science and technology for research and development, identification of and assistance with technical problems, and assistance with product and process development;
- access to business and managerial expertise to identify and assist with business/managerial problems; especially marketing, production, and financial problems;
- computer access to university libraries for information retrieval and/or networking; and
- technical and managerial training.

But apparently significant barriers limit interaction between business, especially small businesses, and academia. Relatively few firms report using academic institutions in the past five years. Fewer are familiar with the institutions and their capabilities and resources. And few firms know how to make useful contacts with our universities and colleges. This situation is not uncommon, but it is exacerbated in economies dominated by small business. Better linkages and networks are imperative.

Major elements of an overall science and technology model currently exist in varying stages of development in Kansas through the Kansas Technology Enterprise Corporation. The research matching program has encouraged some productive interrelations for the firms and institutions involved with respect to joint applied research, which is its purpose, but it is not broad based. The Centers of Excellence program is largely designed to support basic and advanced research that has commercialization potential. It is also selective and narrow in focus, as it needs to be to achieve any significant impact. The seed capital program is now underway in support of new high technology start-ups.

These existing programs are part of the base for a comprehensive state program, but elements with technology transfer and technical assistance primarily for existing industry are needed.

State resources for economic development are limited. By any yardstick, they are modest in magnitude, and their funding is generally soft (being lottery based). One implication of this is that only limited funding is likely to be available for implementing a model for Kansas.

Key Lessons from Other States

The following major implications for a Kansas model are derived from the extensive study of the approaches taken by other states to foster technology development and liaison.

A comprehensive model focuses on three distinct, albeit overlapping, dimensions of technology:

1) basic research;
2) applied research and technology development; and
3) technical assistance.

Basic research is concerned with the generation of new knowledge. Applied research and technology development is the commercial application and extension of state-of-the-art knowledge. Technical assistance refers to the transfer of existing "off-the-shelf" technical knowledge.

Technology transfer and industry liaison occur at all three levels, and management-related expertise and assistance is extremely important at each. Conceptually, management assistance parallels the technology dimensions, and it should be interwoven with each dimension of the model. Management assistance can range from support with day-to-day problems, provided by Small Business Development Centers, to the more intensive specialized assistance provided by advanced technology incubators.

Although many states have separate mechanisms for each of the different levels of technology, we found examples of organizations responsible for both basic research and technology development, or technology development and technical assistance. When such combinations occur, however, we found the tendency for one level of technology to swamp the other, according to the propensities of those controlling the organization. Usually the higher technology level overshadows the lower level.

Where the needs of different levels of

technology are addressed successfully, programs are designed so the people who work in each part of the technology transfer and industrial liaison system are linked with the whole system and with appropriate resources outside the system. Well-established channels of communication between people working in different parts of the system will streamline referrals, improve business access to appropriate levels of expertise, limit duplication of effort, foster cooperative projects, and in general maximize the economic development return on state and private investment in the system.

The state's role in industrial liaison and technology transfer should be to determine the program objectives and principles. Within that framework, a grass roots, decentralized, partnership/consortium, bottom-up organizational structure can meet these objectives more effectively than a top-down approach. A system that allows diverse responses to suit the context and meet current needs seems to be more productive.

We also found that successful programs use educational institutions only in their true areas of expertise and not in others. For example, faculty at research institutions should be involved in basic research and technology development, but in general not in technical assistance. Faculty at other institutions and practitioner experts can provide better technical assistance. An institution's involvement with technology transfer and industrial liaison should not distort or conflict with its basic mission.

Our investigation of technology transfer and liaison revealed funding guidelines for a cost-effective model:

1) In general, state funds should be used to
   - •leverage private sector involvement and commitment;
   - •ensure economic development objectives are paramount;
   - •require that certain needs be met (e.g., ensure that small businesses are not squeezed out by firms with more resources);
   - •encourage, and not stifle, creative responses to need; and
   - •ensure all regions of the state are served.
2) Basic research is mostly funded by the federal government and by traditional state appropriations to institutions. Hence, state economic development funds for basic research should be limited and targeted only to selected pockets of strength with commercial potential.
3) In applied research and technology development the state should act as broker or catalyst, leveraging private sector funds and in-kind contributions.
4) A technology transfer and liaison program for economic development will only be successful if it is market driven. Programs must either be based on partnerships between government and business or be controlled by business. Mechanisms controlled by government tend to emphasize objectives other than economic development.

A multi-level approach that is market driven and has a strong regional dimension is not only the most effective approach, it is also most conducive to political acceptance and support. Legislators and taxpayers will quickly see the impact of regionally based technical assistance programs and be encouraged to continue funding technology development and basic research, which have more long-term impacts.

An Optimum Model for Kansas

The following model is designed to achieve economic development objectives of encouraging and sustaining successful new start-ups, of fostering innovation in new product development and new process implementation, and of enhancing the competitiveness of existing industry.

It is recommended that KTEC sponsor the establishment of

1) three Advanced Technology Centers, anchored at the research universities, to enhance applied research and technology development, and
2) six Regional Technical Services Centers, sponsored by regional public-private consortiums, to provide technical and management assistance.

The former would focus primarily on the economic development objective of new product and new process development through research and development, and the latter primarily on the competitiveness of existing industry through practical technical assistance.

Including organizations already in existence, the comprehensive state model of technology transfer would therefore comprise the following:

Technology Level	Mechanism	Number
basic research (with commercialization potential)	Centers of Excellence	3
applied research and technology	Advanced Technology Development Centers	3
technical assistance	Regional Technical Service Centers	6

Centers of Excellence

Centers of Excellence are already in operation. The following observations are pertinent to the centers as a component of a comprehensive system:

1. The primary objective of the Centers of Excellence should be to enhance basic research in specific fields that have potential for future commercialization. This should be accompanied by a complementary element of technology development and transfer.
2. These centers must be properly funded before they can be reasonably expected to have an economic impact.
3. While university based, the centers must be driven by a university-private sector partnership to ensure a market impact on the research agenda.

Advanced Technology Centers

Three Advanced Technology Centers would be composed of a partnership of industry and higher education and anchored at the state's research universities: the University of Kansas, Kansas State University, and Wichita State University. The primary economic development goal of these centers would be to enhance new product and process development for Kansas businesses. Developing new products and processes entails technology development, applied research, and transfer of state-of-the-art technology from research universities to Kansas industry. In the long run, Advanced Technology Centers will help existing industry remain competitive through technological innovation, and they will support the gestation of new technology-driven enterprises.

A particular mandate of the Advanced Technology Centers would be ensure that small and medium-sized Kansas firms can gain access to research and development and advanced technology assistance. A second objective would be to enhance the state universities' capability to meet the long-term science and technology needs of Kansas industry.

The Advanced Technology Centers would be sponsored by private sector/university consortia and would adopt the nonprofit corporation form of organization. The board of directors (Figure 1) would have a private sector majority with specific small business representation. Other than these aspects, which are specified to ensure the program is market driven, the partners at each Center should be free to design the best structure for meeting economic development objectives. For example, since one objective is to help small business, if a center decides to charge a membership fee to generate matching funds, small business should get a price break.

For the sake of visibility and targeted development, each center should designate and focus upon certain types of advanced science and technology. In its special areas each center would serve the entire state. Its activities, however, would not be restricted to those designated fields; the center could offer assistance outside its designated area if it has other capabilities to draw upon. In addition, the center would be expected to reach out to small business in its geographic region.

The generic task of the Centers would be to facilitate, link, leverage, and broker joint private sector/university advanced technology projects. The specific activities would embrace the following and be undertaken in a proactive manner:

1. arrange research and development on behalf of private firms;
2. help businesses get scientific and technological information and increase university researchers' awareness of private sector research and development needs;
3. help bring technological innovation to the marketplace by identifying problems and bringing high-level technical assistance;
4. support technology-driven incubator development;
5. facilitate assistance in support of technology-oriented entrepreneurship; and
6. foster associated education and training programs.

The state would, through KTEC, provide core or base funding for the organization's infrastructure. It should be clear, however, that Centers must be required to match state funding with funds from private and other public sources. Scope should be provided for the Centers to gain revenues from royalties or licensing on successful projects, which will increase their focus on projects with strong commercialization possibilities. Participation of nonKansas firms could be allowed but monitored to ensure overall benefit to the state.

The Centers would be the focal point for linking potential start-up opportunities with specialist finance sources, such as seed and venture capital funds, and for the development and initial review of applied research matching program funds.

Regional Technical Service Centers

Six Regional Technical Service Centers, geographically dispersed throughout the state, would be sponsored by nonprofit consortia of regional interests, including business, colleges, universities, and economic development organizations. The overall economic development goal of the Regional Centers would be to assist small and medium-sized Kansas firms, particularly manufacturers and technology-oriented service firms, in their efforts to become more competitive producers in today's rapidly changing marketplace. The Regional Centers should be designed to help Kansas firms identify and solve production or other technical problems, to improve production processes and quality, and to take advantage of advanced production techniques and technologies. The goal is the retention and expansion of Kansas industry in a context of rapid technological and market change.

In principle, these Centers do not have to be anchored at a college or university. Indeed, many Kansas colleges and universities do not have technology-related expertise. Nevertheless, most already provide some type of management assistance for business, and they may wish to build on that. Pittsburg State University and the Kansas College of Technology do have technological expertise, and they should lead in the development of the Centers in their regions.

A comprehensive Regional Technical Center program would be engaged in the following activities:

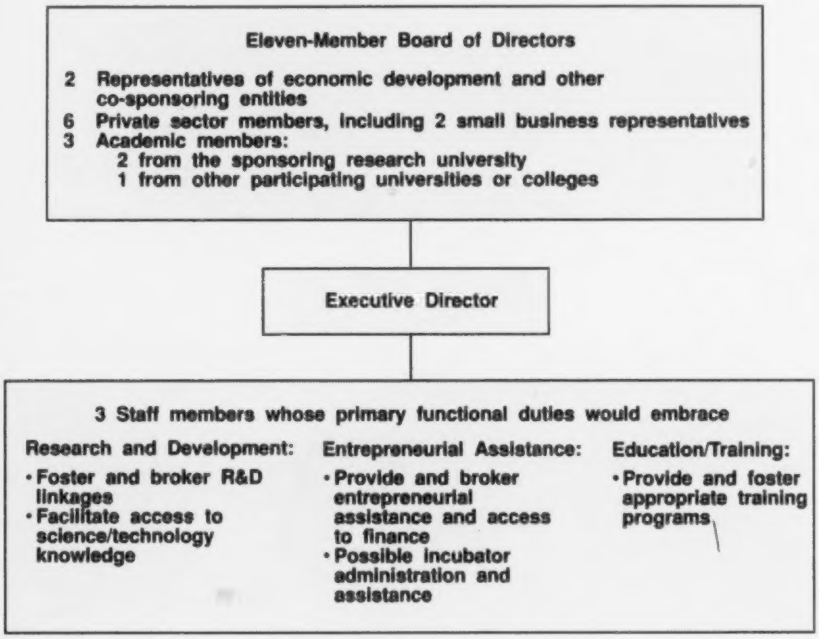
1. technical consulting;
2. helping business evaluate competitive ability and need;
3. helping business identify and apply appropriate new technologies;
4. developing capabilities to help with selected technologies and regional industries;
5. providing information and data services through networking and links with research institutions;
6. directing businesses to appropriate sources of assistance beyond the center; and
7. providing assistance and information on modern management and manufacturing techniques and concepts such as total quality control, inventory control, and computer assisted design and manufacturing.

These services would be provided by experienced in-house professional staff on a fee basis where appropriate (possibly graduated by firm size) and by directing firms to specialized business and manufacturing consultants, both academic and non-academic.

The state should, through the Kansas Technology Enterprise Corporation, provide sufficient core funding to underpin the basic organizational infrastructure. Each Regional Center would be expected to generate matching funds through a combination of regional industry sponsorship (as distinct from individual firm memberships), fees for services, and other sources (e.g., federal, foundation, in-kind space).

Each Regional Technical Service Center would work in partnership with business to meet the needs of its region. Inter-region cooperation to achieve economies of scale for certain activities (e.g., workshops) and complementary services (e.g., types of expertise) would be imperative. Indeed all Centers will need to work together, with the other elements of the technology transfer and industrial liaison system, and the labyrinth of economic development organizations in their region and the state (e.g., Kansas Department of Commerce regional offices, Community Development Corporations, Small Business Development Centers, seed capital funds). In the ultimate, the number of Regional Technical Service Centers will depend upon the willingness of the parties to support an establishment: the number could be more or less than six, depending upon regional support.

Figure 1
A Model for Technology Transfer



Eleven-Member Board of Directors

2 Representatives of economic development and other co-sponsoring entities
6 Private sector members, including 2 small business representatives
3 Academic members:
  2 from the sponsoring research university
  1 from other participating universities or colleges

Executive Director

3 Staff members whose primary functional duties would embrace

Research and Development:
- Foster and broker R&D linkages
- Facilitate access to science/technology knowledge

Entrepreneurial Assistance:
- Provide and broker entrepreneurial assistance and access to finance
- Possible incubator administration and assistance

Education/Training:
- Provide and foster appropriate training programs

Additional Services Needed

To round out a system of technology transfer, industry liaison, and technical assistance, four other types of assistance need the fullest consideration by the appropriate parties in Kansas.

Technical and Resource Information Services

The library system of Kansas is an important information resource for economic development. The libraries at Regents' institutions could serve the scientific, technical, and management information needs of Kansas industry if they were organized into technical information service programs (e.g., dial-up access to on-line library catalogs, information data bases, and information specialists).

Industrial Associates Programs

The Regents should encourage universities to foster communication between academics and the business sector, especially in the areas of science, technology, and management. Contacts between industry and academic researchers could range from periodic joint meetings for the exchange of ideas, personnel exchange, short-term visits to laboratories, equipment sharing, joint symposia and seminars, and faculty supervised graduate student research projects.

Management Development Infrastructure

Many technically competent firms falter or barely survive because of management problems. This is particularly true of many small- to medium-sized firms. The long-term need for competent management is served by our business schools, whose primary mission is to educate and train professional managers at the entry level. The competitive environment makes it imperative, and not just desirable, that modern management techniques be pervasive in Kansas industry in such diverse areas as production management, marketing, human resource management, strategic planning, and financial management. Although the proposed technology transfer centers (Advanced Technology Centers and Regional Technical Service Centers) would have a mandate and an organizational component to respond to management problems as well as technical problems, they will not address the intrinsic management competence of Kansas industry, its responsiveness to change, and its awareness of improved techniques over time. Schools of business must respond to this need.

Institutional Support

This study does not purport to identify all the innovative initiatives that have occurred in higher education throughout the United States in recent years, but the array is impressive. Nevertheless, there are two areas that still need work:

1) creating the mechanisms and associated procedures so industry could easily use, on a fee basis where appropriate, university resources such as computer capacity, libraries, databases, and testing instrumentation; and
2) creating the mechanisms that encourage, rather than discourage, the commercialization of faculty basic research, for example by supporting incubator development and the provision of patent assistance.

Summary

The proposed model of technology transfer is the most appropriate one for Kansas, and has the potential to be the most effective in achieving economic development goals of business development, retention, and expansion. The model has been developed with full recognition of the needs of the state's economy, its private sector, and its institutions of higher education and of the lessons from other states' recent and extensive experience in technology transfer.

The model is consistent with the state's development strategy of supporting internal business retention and formation, and it focuses where the need is greatest, namely existing small and medium-sized firms and start-up firms. It is comprehensive, designed to respond to needs at all technology levels. Yet, through its multi-level approach, research, development, and assistance programs will have full opportunity for success. The model involves the higher education institutions, a key resource for the state, and does so at levels appropriate to their mission and capacities. The broadest possible private sector participation is encouraged through consortia sponsorship, matching, and joint private and public control to ensure a market-driven program. It is a relatively cheap, cost-effective, and action oriented program; the resources are committed to hands-on activity, not "bricks and mortar," and it can be implemented quickly. It is a statewide model; any business with a problem should be able to secure appropriate assistance from the networked system.

Note

1. M. Elizabeth Stella and Anthony Redwood, "Technology Transfer Problems Facing Kansas Industry: A Survey of Kansas Manufacturing Firms," *Kansas Business Review*, Vol. 13, no. 1, 1989.

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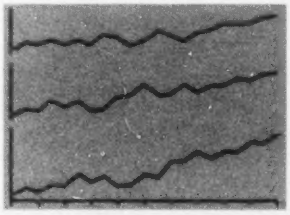
This research project was funded by the Kansas Technology Enterprise Corporation (KTEC). The authors wish to acknowledge the assistance of Dr. William G. Brundage, president of KTEC, the many Kansans who participated in this project (administrators from all Kansas Regents' institutions, public community colleges, and Washburn University; businessmen and women from the over 300 Kansas firms who completed surveys), and those officials who gave of their time and knowledge during our investigation of their states' programs. We also wish to acknowledge the contributions of Dennis Depenbusch and Dennis Maygers, research assistants who worked on the project.

A copy of the complete report, *Technology Transfer and Industry Liaison for Kansas Economic Development*, Monograph Series number 161, can be obtained from the Institute for Public Policy and Business Research, 607 Blake Hall, University of Kansas, Lawrence, Kansas 66045-2960.



Economic Indicators

Comparison Indicators*

					% Change From	
	Quarter or Month	Current Period	Previous Period	Year Ago	Previous Period	Year Ago
Personal Income - Annual rates, SA						
Kansas - Mil. $	1st	41675.0	40893.0	38632.0	1.91	7.88
United States - Bil. $	2nd	4399.57	4317.77	4026.60	1.89	9.26
Employment						
Kansas - Thou., NSA	2nd	1241.85	1219.43	1217.65	1.84	1.99
United States - Mil., SA	2nd	117.29	116.90	114.69	0.33	2.27
Unemployment Rate						
Kansas - % NSA	2nd	4.3	4.9	4.8		
United States - % SA	2nd	5.3	5.2	5.5		
Retail Sales - Annual rates						
Kansas - Mil. $, NSA	2nd	17978.50	17854.49	17557.38	0.69	2.40
United States - Bil. $, SA	2nd	1705.58	1675.94	1608.56	1.77	6.03
Consumer Price Index-U, All items, SA						
Kansas City* - 1982-1984 = 100	Jan.-June	120.60	118.40	116.3	1.86	3.70
United States - 1982-1984 = 100	Jan.-June	122.88	119.68	117.02	2.67	5.01

Kansas Indicators

New Incorporations, NSA						
For Profit - Number	2nd	1065	1131	1072	-5.84	-0.65
Tax Revenue, NSA						
General Fund Tax Revenue - Mil. $	2nd	653.79	494.05	680.13	32.33	-3.87
Operating Expenditures, NSA						
General Fund Operating Expenditures - Mil. $	2nd	526.91	510.57	479.54	3.20	9.88

* The Kansas City CPI-U is published semi-annually with the first period being January through June average and the second period being July through December average. National employment and unemployment rate figures are based on the Current Population Survey (household survey). State figures are based on the Current Employment Statistics Survey (establishment survey).

NSA-Not seasonally adjusted.
SA-seasonally adjusted.

SOURCES: BEA, BLS, Ks. Dept. of Human Resources, Ks. Secretary of State, Ks. Dept. of Administration, Ks. Dept. of Revenue.

National Indicators

	Quarter or Month	Current Period	Previous Period	Year Ago	% Change From Previous Period	% Change From Year Ago
Income Measures, Annual rates						
Gross National Product - Bil. 82$	2nd	4134.00	4106.80	4010.70	0.66	3.07
Disposable Personal Income - Bil. 82$	2nd	2886.57	2881.60	2773.30	0.17	4.08
Personal Consumption - Bil. 82$	2nd	2655.30	2641.00	2586.80	0.54	2.65
Gross Private Investment - Bil. 82$	2nd	719.20	721.10	713.50	-0.26	0.80
Net Export of Goods and Services - Bil. 82$	2nd	-52.50	-55.00	-72.60		
Government Purchases - Bil. 82$	2nd	812.00	799.70	783.00	1.54	3.70
Savings Rate - %	2nd	5.40	5.40	4.00		
Labor Force						
Civilian Labor Force - Mil.	June	124.10	123.61	121.52	0.40	2.12
Employed - Mil.	June	117.54	117.22	115.00	0.28	2.21
Unemployed - Mil.	June	6.56	6.40	6.52	2.60	0.58
Unemployment Rates - percent						
All	June	5.30	5.20	5.40		
Women	June	5.60	5.30	5.50		
Men	June	5.00	5.00	5.30		
Teens	June	15.60	15.20	14.10		
Blacks and other than white	June	10.30	9.50	10.30		
Whites	June	4.50	4.40	4.60		
General Business						
Industrial Production - 1977 = 100	2nd	141.57	140.67	136.00	0.64	4.09
Manufacturing and Trade Sales - Bil. 82$	1st	1391.40	1391.30	1350.50	0.01	3.03
Manufacturing and Trade Inventories - Bil. 82	1st	2072.35	2052.60	2005.76	0.96	3.32
New Orders, Durable Goods - Bil. 82$	2nd	319.99	321.95	315.36	-0.61	1.47
Capacity Utilization, Mfg. %	2nd	84.20	84.40	83.20		
New Housing Starts, Private - Thou.	2nd	4070.00	4552.00	4431.00	-10.59	-8.15
Prices						
Consumer Prices - 1982-1984 = 100						
CPI-U, All Items	June	124.20	124.00	118.10	0.16	5.17
Food	June	125.30	125.00	117.80	0.24	6.37
Housing	June	122.60	122.30	118.20	0.25	3.72
Apparel	June	119.10	120.40	115.90	-1.08	2.76
Transportation	June	115.90	116.10	108.40	-0.17	6.92
Medical	June	148.70	147.60	138.40	0.75	7.44
Producer Prices - 1982-1984 = 100 (NSA)						
All Commodities	June	112.80	113.10	107.20	-0.27	5.22
Industrial Commodities	June	112.30	112.40	106.40	-0.09	5.55
Crude Materials	June	103.90	106.30	97.90	-2.26	6.13
Capital Equipment	June	118.60	117.90	113.90	0.59	4.13
Agricultural Prices - 1977 = 100						
Prices Received	June	147.00	151.00	138.00	-2.65	6.52
Prices Paid	June	177.00	177.00	168.00	0.00	5.36
Monetary and Credit Aggregates**						
Total Reserves	2nd	-8.70	-4.20	6.10		
M1	2nd	-5.50	-0.40	6.40		
Commercial Banks						
Savings	2nd	-14.10	-3.70	10.40		
Small Denomination Time	2nd	29.20	22.50	12.90		
Large Denomination Time	2nd	17.80	18.10	9.10		
Thrift Institutions						
Savings	2nd	-18.80	-7.70	2.60		
Large Denomination Time	2nd	5.80	1.20	9.20		
Debt Components						
Federal	2nd	6.60	7.70	8.30		
Nonfederal	2nd	7.70	8.40	8.90		
Interest Rates - Monthly						
Prime Rate - %	June	11.07	11.50	9.00		
Discount Rate - %	June	7.00	7.00	6.00		

* Seasonally Adjusted

** Annual rates of change, seasonally adjusted in percent.

SOURCES: BEA, BLS, Survey of Current Business, Federal Reserve Bulletin.

Quarterly Employment in Kansas

				% Change From	
	1989	1989	1988	1989	1988
	Q2	Q1	Q2	Q1	Q2
Civilian Labor Force - Thou.	1297.65	1282.92	1279.32	1.15	1.43
Employed - Thou.	1241.85	1219.43	1217.65	1.84	1.99
Farm Employment - Thou.	59.33	47.97	62.53	23.70	-5.12
Unemployed - Thou.	55.80	63.50	61.67	-12.12	-9.52
Initial Claims for Unemployment Insurance - Thou.	10.92	15.84	10.18	-31.07	7.25
Average Work Week, Manufacturing - Hrs.	40.27	40.23	40.77	0.08	-1.23
Industry Employment, in thousands					
All Industries	1059.60	1037.97	1035.93	2.08	2.28
Manufacturing	184.43	182.83	181.63	0.88	1.54
Durable Goods	110.03	109.30	107.20	0.67	2.64
Fabricated Metal Production	11.37	11.37	11.33	0.00	0.29
Machinery (including Electrical)	30.03	29.90	29.07	0.45	3.33
Transportation Equipment	47.43	47.77	46.40	-0.70	2.23
Nondurable Goods	74.40	73.53	74.43	1.18	-0.04
Food and Kindred Products	26.60	26.50	26.70	0.38	-0.37
Meat Products	14.43	14.33	14.37	0.70	0.46
Printing and Publishing	20.77	20.30	20.57	2.30	0.97
Petroleum and Coal	3.00	.97	2.97	1.12	1.12
Mining	9.93	9.63	10.67	3.11	-6.88
Oil and Gas Extraction	8.63	8.43	9.20	2.37	-6.16
Contract Construction	42.27	36.70	43.37	15.17	-2.54
Transportation and Public Utilities	65.60	64.53	65.60	1.65	0.00
Wholesale Trade	68.70	67.93	68.47	1.13	0.34
Retail Trade	191.83	189.20	189.80	1.39	1.07
Finance, Insurance, and Real Estate	58.40	57.70	58.30	1.21	0.17
Services	221.43	216.53	211.90	2.26	4.50
Federal Government	30.17	29.83	29.07	1.12	3.78
State and Local Government	186.83	183.07	178.13	2.06	4.88

SOURCES: BLS, Ks. Dept. of Human Resources.

Quarterly Kansas Retail Sales (in millions of dollars)

				% Change From	
	1989	1989	1988	1989	1988
	Q2	Q1	Q2	Q1	Q2
Apparel	473.26	535.47	448.71	-11.62	5.47
Automotive	3508.00	2988.39	3504.10	17.39	0.11
Food	4436.97	4374.95	4026.38	1.42	10.20
Furniture	891.57	942.62	1052.44	-5.42	-15.29
General Merchandise	3015.92	3378.92	2654.30	-10.74	13.62
Lumber and Building Materials	1293.64	1182.52	1249.29	9.40	3.55
Professional and Personal Services	1472.48	1178.30	1019.22	24.97	44.47
Public Utilities	443.45	779.03	802.22	-43.08	-44.72
Unclassified	1489.27	1531.55	1612.95	-2.76	-7.67
Farm and Garden Products	24.71	29.46	20.78	-16.12	18.90
Manufacturing and Trading	921.29	906.80	1080.27	1.60	-14.72
Miscellaneous	7.95	26.47	86.73	-69.96	-90.83
Total	17978.50	17854.49	17557.38	0.69	2.40

NOTE: Retail sales figures are based on sales tax collections. Actual and reported retail sales may vary.

Quarterly Personal Income in Kansas*

	1989 Q2	1989 Q1	1988 Q2	% Change From 1989 Q1	% Change From 1988 Q2
Total Personal Income - Mil. $	41675	40893	38632	1.91	7.88
Nonfarm Income - Mil. $	40011	39130	36738	2.25	8.91
Farm Income - Mil. $	1664	1763	1894	-5.62	-12.14
Average Weekly Earnings, Mfg.** - $	419	427	412	-1.90	1.67
Earnings by Industry, in Millions					
Nonfarm	27436	26863	25077	2.13	9.41
Farm	1664	1763	1894	-5.62	-12.14
Manufacturing	5489	5301	4982	3.55	10.18
Durable Goods	3477	3396	3070	2.39	13.26
Nondurable Goods	2012	1905	1912	5.62	5.23
Mining	276	278	314	-0.72	-12.10
Contract Construction	1564	1586	1543	-1.39	1.36
Transportation and Public Utilities	2447	2389	2224	2.43	10.03
Wholesale Trade	2011	1950	1847	3.13	8.88
Retail Trade	2784	2740	2585	1.61	7.70
Finance, Insurance, and Real Estate	1633	1606	1470	1.68	11.09
Services	6186	6061	5453	2.06	13.44
Federal Government	830	799	760	3.88	9.21
State and Local Government	730	714	706	2.24	3.40

* Seasonally adjusted, at annual rates
** Not seasonally adjusted.

SOURCES: BEA, Ks. Dept. of Human Resources.

Monthly Kansas Agricultural Indicators*

	1989 June	1989 May	1988 June	% Change From 1989 May	% Change From 1988 June
Prices Received					
All Farm Products - 1977 = 100	176	176	171	0.00	2.92
All Crops - 1977 = 100	160	163	147	-1.84	8.84
Wheat - $/Bu.	3.90	3.96	3.27	-1.52	19.27
Sorghum Grain - $/Bu.	3.90	3.96	4.14	-1.52	-5.80
Corn - $/Bu.	2.52	2.57	2.71	-1.95	-7.01
Soybeans - $/Bu.	6.84	7.07	8.25	-3.25	-17.09
All Hay - $/Ton	97.00	98.00	68.00	-1.02	42.65
Livestock and Products - 1977 = 100	186	184	186	1.09	0.00
All Beef Cattle - $/Cwt.	71.40	70.90	71.30	0.71	0.14
Steers and Heifers - $/Cwt.	72.20	74.50	72.60	-3.09	-0.55
Calves - $/Cwt.	92.00	91.90	81.80	0.11	12.47
Hogs - $/Cwt.	43.30	40.20	44.60	7.71	-2.91
Milk - $/Cwt.	11.90	11.70	11.00	1.71	8.18

* Not seasonally adjusted.

SOURCE: Ks. Crop and Livestock Reporting Service.

Quarterly Employment and Sales for SMSAs and Counties

				% Change From	
	1989 Q2	1989 Q1	1988 Q2	1989 Q1	1988 Q2
Wichita SMSA					
Civilian Labor Force - Thou.	260.97	258.98	252.89	0.77	3.19
Employed - Thou.	249.66	246.70	239.66	1.20	4.17
Unemployment Rate - %	4.33	4.73	5.23		
Retail Sales - Mil. $	941.29	41.40	882.31	-0.01	6.69
Kansas Portion of Kansas City SMSA					
Civilian Labor Force - Thou.	331.42	330.23	325.67	0.36	1.77
Employed - Thou.	316.97	313.81	310.42	1.01	2.11
Unemployment Rate - %	4.33	4.97	4.67		
Retail Sales - Mil. $	1075.71	1063.72	1021.92	1.13	5.26
Topeka SMSA					
Civilian Labor Force - Thou.	93.70	93.33	92.02	0.39	1.83
Employed - Thou.	89.57	88.72	87.88	0.96	1.92
Unemployment Rate - %	4.43	4.93	4.47		
Retail Sales - Mil. $	330.59	324.17	319.14	1.98	3.59
Lawrence SMSA					
Civilian Labor Force - Thou.	41.74	41.75	40.46	-0.02	3.17
Employed - Thou.	40.24	40.12	38.80	0.29	3.72
Unemployment Rate - %	3.63	3.90	4.10		
Retail Sales - Mil. $	117.08	114.58	109.77	2.19	6.66
Riley County--Manhattan Area					
Civilian Labor Force - Thou.	28.51	28.76	28.15	-0.88	1.27
Employed - Thou.	27.58	27.71	27.05	-0.48	1.94
Unemployment Rate - %	3.27	3.67	3.90		
Retail Sales - Mil. $	63.21	63.09	58.42	0.18	8.19
Reno County--Hutchinson Area					
Civilian Labor Force - Thou.	30.92	30.92	31.15	0.01	-0.73
Employed - Thou.	29.40	29.15	29.46	0.86	-0.19
Unemployment Rate - %	4.90	5.73	5.43		
Retail Sales - Mil. $	105.34	104.76	100.01	0.55	5.33
Crawford County--Pittsburg Area					
Civilian Labor Force - Thou.	17.01	16.74	17.34	1.64	-1.85
Employed - Thou.	16.16	15.72	16.31	2.79	-0.94
Unemployment Rate - %	5.00	6.07	5.90		
Retail Sales - Mil. $	45.23	44.60	44.55	1.40	1.51
Lyon County--Emporia Area					
Civilian Labor Force - Thou.	19.65	19.89	19.56	-1.22	0.44
Employed - Thou.	18.78	18.76	18.58	0.07	1.03
Unemployment Rate - %	4.47	5.67	5.00		
Retail Sales - Mil. $	52.39	50.36	50.81	4.02	3.10
Saline County--Salina Area					
Civilian Labor Force - Thou.	27.89	27.78	27.48	0.41	1.51
Employed - Thou.	26.57	26.25	26.07	1.22	1.92
Unemployment Rate - %	4.73	5.50	5.10		
Retail Sales - Mil. $	105.23	104.02	101.51	1.16	3.66
Barton County--Great Bend Area					
Civilian Labor Force - Thou.	14.65	14.50	14.52	1.03	0.86
Employed - Thou.	13.97	13.74	13.66	1.69	2.28
Unemployment Rate - %	4.63	5.27	6.00		
Retail Sales - Mil. $	59.95	57.99	60.05	3.37	-0.16
Montgomery County--Coffeyville Area					
Civilian Labor Force - Thou.	18.37	17.97	18.07	2.23	1.64
Employed - Thou.	17.37	16.91	16.85	2.71	3.07
Unemployment Rate - %	5.47	5.90	6.73		
Retail Sales - Mil. $	52.57	52.79	52.88	-0.41	-0.59

SOURCES: Ks. Dept. of Human Resources, Ks. Dept. of Revenue.

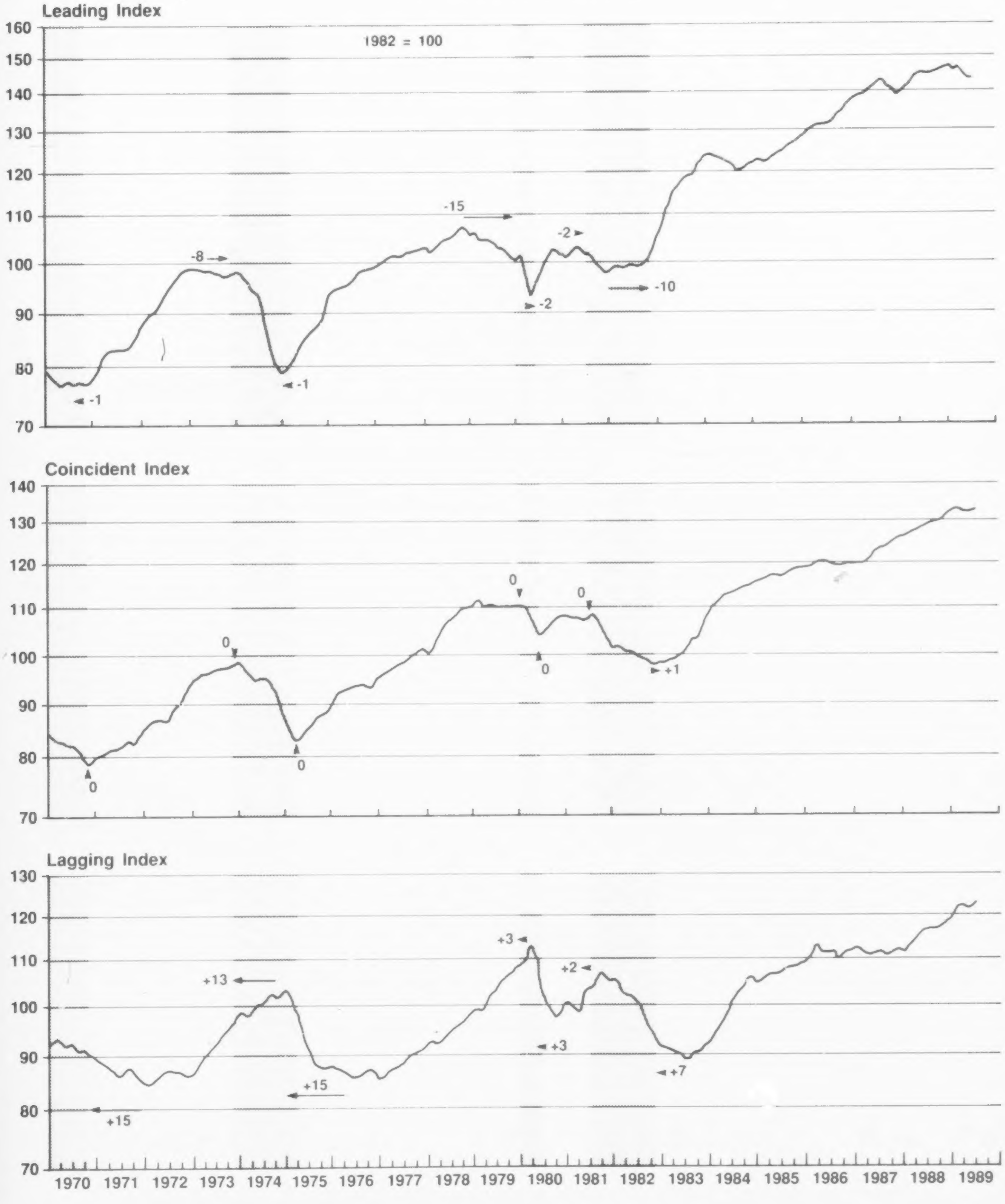
Quarterly Banking and Savings and Loan Activity in Kansas*

	1989 Q2	1989 Q1	1988 Q2	% Change From 1989 Q1	% Change From 1988 Q2
Federal Reserve Member Banks					
Kansas, in Millions					
Total Deposits	37828.0	37889.3	36631.6	-0.16	3.27
Total Checkable	6067.0	6277.0	6229.2	-3.35	-2.60
Demand Deposits	2918.0	3040.7	3088.1	-4.03	-5.51
Other Checkable	3149.0	3236.3	3143.7	-2.70	0.17
Small Time and Savings	25363.7	25101.0	5054.5	1.05	1.23
Large Time	6397.3	6511.3	5333.7	-1.75	19.94
Kansas City, KS, in Millions					
Total Loans	1749.98	1762.32	1764.68	-0.70	-0.83
Real Estate	953.64	950.86	907.99	0.29	5.03
Commercial and Industrial	523.40	533.82	549.51	-1.95	-4.75
Consumer	100.79	100.82	99.42	-0.04	1.37
Total Deposits	2045.11	2040.86	1944.62	0.21	5.17
Demand Deposits	212.66	219.72	233.17	-3.22	-8.80
Time and Savings	1159.81	1163.18	1085.70	-0.29	6.83
Topeka, in Millions					
Total Loans	388.69	387.41	370.48	0.33	4.92
Real Estate	130.88	122.71	107.95	6.65	21.24
Commercial and Industrial	132.17	140.74	138.15	-6.09	-4.33
Consumer	67.37	70.62	76.07	-4.60	-11.44
Total Deposits	509.86	535.89	523.57	-4.86	-2.62
Demand Deposits	144.51	165.43	172.67	-12.65	-16.31
Time and Savings	230.71	234.74	221.38	-1.72	4.22
Wichita, in Millions					
Total Loans	1372.19	1367.63	1309.29	0.33	4.80
Real Estate	301.69	296.05	265.76	1.90	13.52
Commercial and Industrial	486.27	494.12	493.10	-1.59	-1.39
Consumer	425.74	414.04	399.23	2.82	6.64
Total Deposits	2011.94	1983.80	1907.87	1.42	5.45
Demand Deposits	453.02	463.53	458.39	-2.27	-1.17
Time and Savings	1049.30	1047.67	954.23	0.16	9.96
Savings and Loan Activity					
Kansas, in Millions					
Total Assets	22752.55	22859.27	21718.20	-0.47	4.76
Mortgage Loans	14400.60	14668.77	14569.50	-1.83	-1.16
Kansas City, KS, in Millions					
Total Assets	2451.10	2466.97	2351.33	-0.64	4.24
Mortgage Loans	1908.45	1940.87	1919.03	-1.67	-0.55
Topeka, in Millions					
Total Assets	3409.30	3418.83	3204.50	-0.28	6.39
Mortgage Loans	2960.10	2967.40	2785.13	-0.25	6.28
Wichita, in Millions					
Total Assets	1853.35	1872.17	1846.40	-1.01	0.38
Mortgage Loans	1353.25	1320.73	1312.53	2.46	3.10

* The data for banks above pertain only to Federal Reserve member banks of Kansas and do not represent all commercial banking in the state. Since 1980, these data have covered approximately 50 percent of the state's banking activity.

SOURCE: Federal Reserve Bank of Kansas City and Federal Home Loan Bank of Topeka.

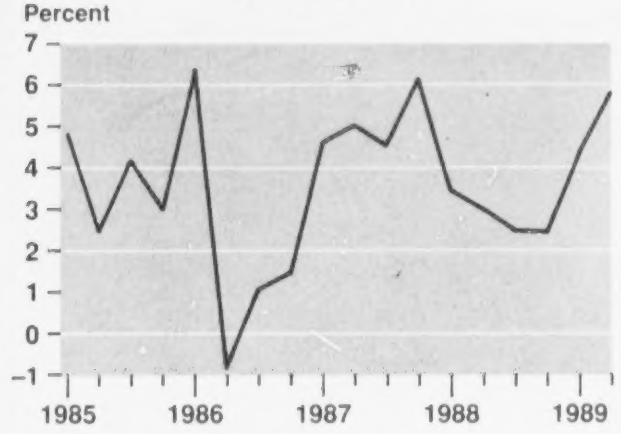
U.S. Composite Indexes



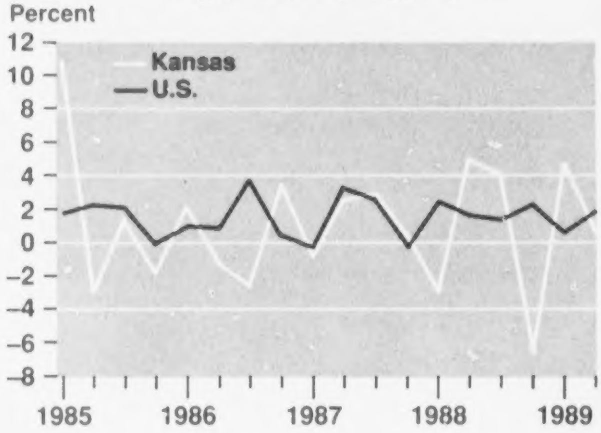
Source: Bureau of Economic Analysis, *Business Conditions Digest*

Note: Numbers entered on the chart indicate length of leads (—) and lags (+) in months from reference turning dates. Shading indicates periods or recession.

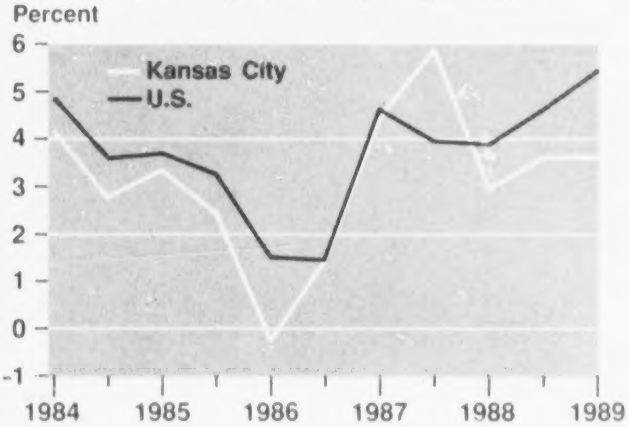
Average Annual Growth Rate of GNP
(1982 Dollars)



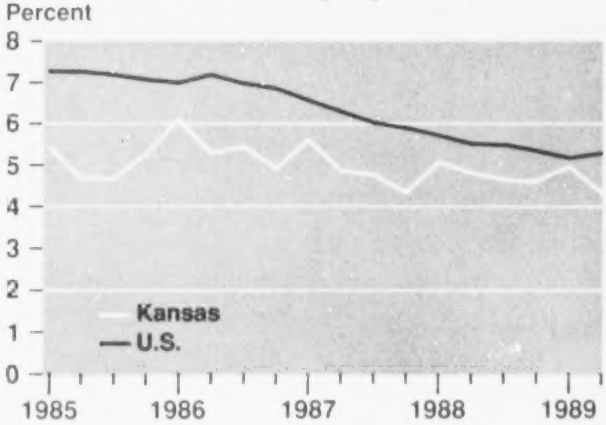
Growth of Retail Sales
(In Current Dollars)



Rate of Inflation
(CPI-U, Seasonally Adjusted)



Civilian Unemployment Rate



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Economic Outlook Issue

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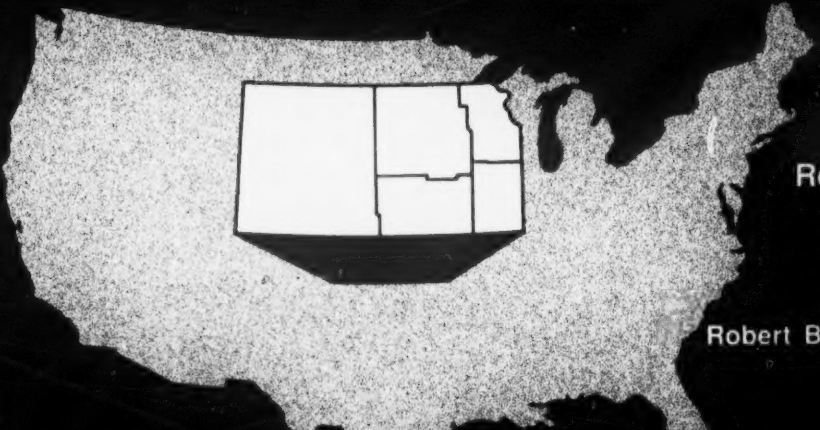

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The purpose of the *Kansas Business Review* is to provide a forum for the dissemination of research studies and reports in the fields of economics and business that would be of special interest and relevance to business persons, public officials, and academicians in Kansas and the Plains Region.

The Editorial Review Board welcomes submissions of original manuscripts as well as reports on research and opinion pieces. The style, however, should emphasize exposition rather than technical details. All submissions will be reviewed initially by the editorial staff and, when judged appropriate, will be sent to referees who are knowledgeable about the content.

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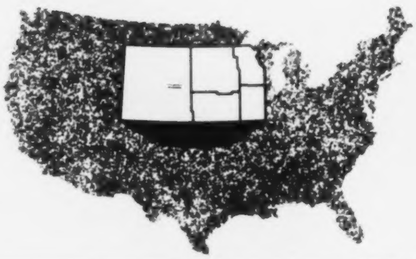
We invited economists from each of the Regents' universities to share their forecasts for 1990 with our readers.

1990 Outlook for Kansas and the Nation



Norman Clifford

Norman Clifford is director of the Kansas Econometric Model and an assistant professor of economics at the University of Kansas. Funding for the Kansas Economic Modeling Program at the Institute is provided by the State of Kansas.

Introduction

After showing somewhat surprising strength in 1989, the national economy will weaken in 1990; although a recession appears unlikely, real GNP will grow only about 2 percent. Major factors in the slowdown will be weaker growth of both exports and investment in producers' durable equipment. Growth of consumer spending will be strong relative to income growth, and will be an important factor in keeping the economy moving ahead. Slower growth will reduce inflationary pressures, and the Federal Reserve Board will respond by relaxing its constraints on money supply growth; as a result, interest rates will be lower during 1990 than they were during 1989. Slower economic growth will mean slower growth of personal income and a slight increase in the unemployment rate.

During the 1980s the overall Kansas economic performance has reflected the national economic experience, although on average the Kansas economy has grown more slowly than the U.S. economy. The Kansas forecast for 1990 exhibits the same trend, with economic growth in the state being smaller relative to both the state's 1989 growth and the 1990 forecast for the nation. An important factor in the Kansas employment rate will be growth in the manufacturing sector, which will actually be stronger in 1990 than it was in 1989, driven by growth in the printing and publishing, transportation equipment, and machinery subsectors. Growth in employment in services will also be above average, following recent trends. Although construction employment will end its decline in response to lower interest rates and an increase in highway construction activity in Kansas, it will not return to its 1987 level. Slow growth in employment in trade will be the result of slower growth in personal income. Personal income growth in Kansas will slow, as lower employment growth will lead to a lower rate of growth of income to labor, while lower interest rates will be felt in a reduced rate of growth of dividend, interest, and rental income.

These are the highlights of the national and Kansas forecasts developed at the Institute for Public Policy and Business Research and presented below.[1]

The National Economy

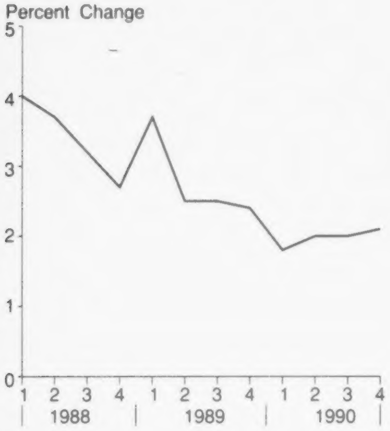
The 1990 forecast is based on the following assumptions:

1. The Federal Reserve Board will continue to follow the more liberal course that it began in mid 1989. In 1987 the M2 measure of the money supply grew 6.8 percent and during the first half of 1988 it grew at a 6.2 percent annual rate. The Fed began to react to signs of impending inflation, however, during the second half of 1988 when the growth rate of M2 was only 4.6 percent. The first half of 1989 was a period of even stricter control, with money supply growth averaging only 1.6 percent and interest rates rising sharply. However, during the third quarter of 1989, the Fed reacted to signs of a downturn in economic growth by relaxing its constraint on money supply growth, and M2 grew at an annual rate of 7.5 percent. The forecast assumes that the new attitude will continue throughout the forecast period, with M2 growth averaging 6.0 percent during the second half of 1989, and 7.4 percent for all of 1990. The 1990 growth will be stronger during the first half of the year, with the Fed slowing money growth slightly during the second half of the year as inflationary pressures reappear.
2. Fiscal policy will be characterized by modest restraint in government spending. Real federal purchases will fall slightly, about 0.3 percent, in 1990. This will come about because of a 1.9 percent decrease in federal defense purchases, which will be nearly offset by a 4.7 percent increase in nondefense spending.
3. The value of the dollar will weaken throughout the forecast period. A trade weighted average of the exchange rate of the dollar will decline at a 4 percent annual rate.
4. Real gross national product of our major trading partners in the OECD will grow at a 3 percent annual rate.[2]
5. Imported oil prices will increase modestly at a 2.5 percent annual rate.

Given these assumptions, the forecast for the national economy in 1990 is for slower growth. Real gross national product will grow 2.1 percent, compared to 3.0 percent in 1989 and 4.4 percent in 1988. Although this is by no means a recession, it is a significant slowdown. Figure 1 shows the quarterly pattern of the forecast for GNP growth. GNP growth will be slowest during 1990's first quarter, and will increase gradually during the rest of the year.

The reasons for slower 1990 growth can be found in the performance of the economy in 1989. In fact, in terms of the performance of the national economy, the first half of 1989 closely resembles 1988; GNP growth averaged 3.2 percent compared to 1988's 4.4 percent. We find a more important resemblance, however, if we look at the reasons for 1988 growth: growth in real

Figure 1
Real GNP Growth*



*Annual growth rates.

exports and growth in investment in producers' durable equipment. In 1988, real exports grew 17.6 percent; during the first half of 1989 they grew at a 13.5 percent annual rate. In 1988, investment in producers' durable equipment grew 11.5 percent; during the first half of 1989, it grew 12.2 percent. During the third quarter of 1989, however, exports did not grow at all, and investment in producers' durable equipment grew 5.2 percent. Our forecast calls for a continuation of curtailed growth in these two categories. Real exports are forecasted to grow 6.7 percent in 1990, and investment in producers' durable equipment is forecasted to grow 5.3 percent.

Figure 2 attempts to capture the magnitude of the effects of slower growth of exports and investment in producers' durable equipment on the growth of the economy. The data are divided into two time periods: the first period is the six quarters beginning with the first quarter of 1988, and the second period is the six quarters beginning with the third quarter of 1989. The first category is GNP growth; for each of the other expenditure categories, the growth rate associated with that category is the rate at which GNP would have grown if the category had grown at its actual historical (first period) or forecasted (second period) rate and no other expenditure component had grown. Thus, export growth alone directly contributed 1.7 percentage points to GNP growth during the earlier period, but is forecasted to contribute only 0.8 percentage points to GNP growth during the later period. Similarly, growth of investment in producers' durable equipment alone directly accounted for 0.8 percentage points of GNP growth in the earlier period, and is forecasted to account for only 0.5 percentage points of growth in GNP in the later period. Together, these two categories are forecasted to contribute only 1.3 percentage points to GNP growth compared to 2.5 percentage points during the period from the beginning of 1988 to the middle of 1989. Furthermore, the magnitude of the effects of the slowdown in growth of exports and investment in producers' durable equipment is understated by these results. Reduced growth of spending on exports and producers' durable equipment means that firms that produce these goods will experience slower growth; therefore, incomes that depend on these firms will grow more slowly. Slower growth of incomes means slower growth in consumption spending; thus, there is an indirect effect in the form of reduced growth of consumption spending that is not accounted for in Figure 2.

The major category of demand for gross national product, consumption spending, will not experience such an extreme slowdown in growth in 1990. Real consumption spending will increase 2.2 percent in 1990, compared to 2.8 percent in 1989. Here again one can see the shift in strength away from investment in producers' durables and exports; the 1989 growth rate of consumer spending was slower than the overall rate of growth of the economy, indicating that the strength of the economy was coming from other sectors, whereas the forecasted 1990 growth rate of consumption spending is greater than the overall rate of growth of the economy, indicating that the non-consumption sectors will no longer be driving the economy.

Among the consumption categories, growth in consumer spending on durable goods will show the greatest decline, from 4.1 percent in 1989 to just 2.1 percent in 1990. Spending on motor vehicles and parts will grow 2.3 percent, about the same as in 1989, but growth in spending on furniture and household equipment will continue the trend begun during the third quarter of 1989, and grow only 2.6 percent in 1990 compared to 7.5 percent for all of 1989. Consumption of all other categories of durable goods will grow 0.6 percent, compared to 0.2 percent in 1989.

Consumer expenditures on nondurable goods will grow 1.2 percent in 1990, the same as in the previous year.

Figure 2
Contributions to Real GNP Growth

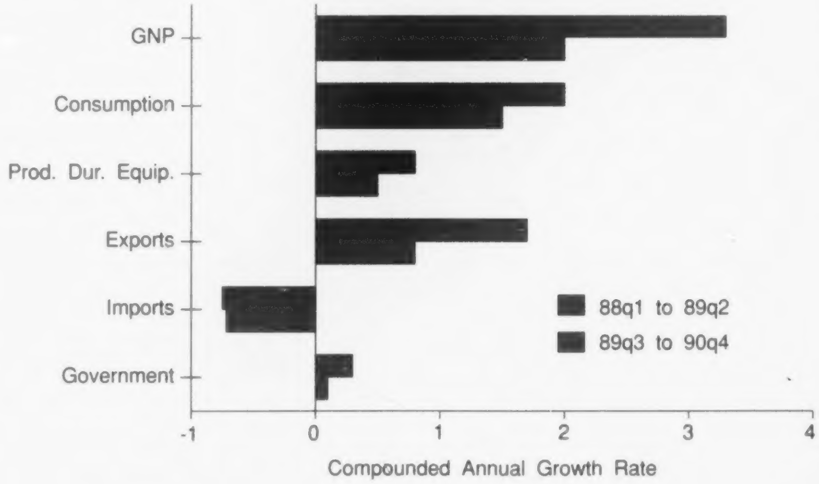
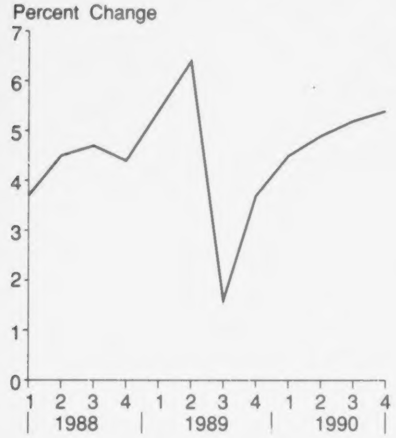


Figure 3
Inflation Rate*



*Percent change of Consumer Price Index.

Consumption of food will grow 0.3 percent, compared to 0.7 percent in 1989, while consumer expenditures on apparel will grow at the same rate as they did in 1989, 4.8 percent. Consumption of gasoline and oil will grow 1.4 percent, after falling 0.5 percent in 1989, and consumer spending on fuel oil and coal will decline 1.4 percent following a decline of 3.9 percent last year. Consumer expenditures on services, which amount to more than half of total spending by consumers, will grow 3.1 percent, down slightly from 1989's 3.5 percent growth rate.

Growth of spending on imports will decline due to reduced growth of consumer spending and a continued modest fall in the value of the dollar. This reduction in the growth of imports will be great enough that export growth will continue to exceed import growth, resulting in some improvement in the trade deficit. Measured on the national income and products account basis, the trade deficit will fall from $61 billion in 1989 to $50 billion in 1990.

Government purchases of goods and services will increase 0.9 percent in 1990, compared to 2.8 percent in 1989. The slight decrease in federal purchases will be more than offset by a 1.8 percent increase in purchases by state and local governments. In nominal terms, however, total federal government outlays will grow 5.3 percent, compared to 7.0 percent in 1989. The main reasons for this growth are a 4.6 percent increase in the average price level of government purchases, a 9.1 percent increase in transfer payments, at least part of which is attributable to the slowdown in economic growth, and a 7.1 percent increase in federal net interest payments. On the other hand, total federal government receipts will grow only 6.8 percent in 1990, compared to 7.8 percent in 1989. The reasons for this reduced growth are slower growth of personal income tax receipts attributable to reduced growth of personal income, and a significant reduction in corporate profits tax accruals attributable to reduced corporate profits associated with the slowing economy. Since outlays will grow a bit more slowly than receipts, there will be a slight reduction in the federal government's budget deficit.

The forecasted dampening of economic growth for 1990 will cause some reduction of inflationary pressures, especially during the first half of the year. The quarterly path of the forecast of the inflation rate as measured by the change in the consumer price index for all urban consumers is shown in Figure 3. One salient feature of Figure 3 is the big drop in the rate of inflation during the third quarter of 1989, a major part of which was due to a large drop in the transportation price index. The price index for motor fuel fell 28 percent, while the prices of new cars fell 4 percent, leading to a 7.4 percent decline in the transportation price index. Even if we look at the rate of inflation excluding transportation prices, however, we find that during that quarter the price level increased at a very modest 3.4 percent annual rate, but as Figure 3 indicates, we do not foresee this relatively low rate as representative of the underlying inflationary pressures in the economy. Our forecast is for the rate of inflation to increase beginning in the last quarter of 1989 and to continue increasing throughout 1990, although never quite returning to the levels reached during the first half of 1989. The inflation rate will average 4.3 percent for the year, compared to 4.7 percent for 1989.

Among items that will have higher than average rates of inflation during 1990 are medical care (9.9 percent), services (8.7 percent), entertainment (6.6 percent), food and beverages (5.2 percent), and housing (4.8 percent). Major items that will have lower than average inflation rates during the year are apparel and upkeep (1.3 percent) and transportation (0.3 percent).

The weakening of the economy predicted for 1990 will also be seen in a modest increase in the unemployment rate. In 1988 and early 1989 the rate of growth of employment exceeded that of the labor force and there was a gradual decline in the unemployment rate throughout the period. In the second quarter of 1989, although labor force growth was at about the average for the previous five quarters, the growth rate of employment fell below the growth rate of the labor force and the unemployment rate increased. A gradual increase in the unemployment rate is expected to continue throughout 1990, with the unemployment rate for the year expected to average 5.4 percent compared to 5.2 percent during 1989. The recent history and forecast for nonfarm wage and salary employment growth is shown in Figure 4.

A combination of a slowdown in economic growth and signs of reduced inflationary pressures has led the Federal Reserve Board to adjust its policies somewhat, as evidenced by the fact that M2 grew 7.5 percent in the third quarter of 1989, compared to 1.6 percent during the first half of the year. As a result, interest rates, which had risen steadily

Figure 4
Nonfarm Wage and Salary Employment Growth

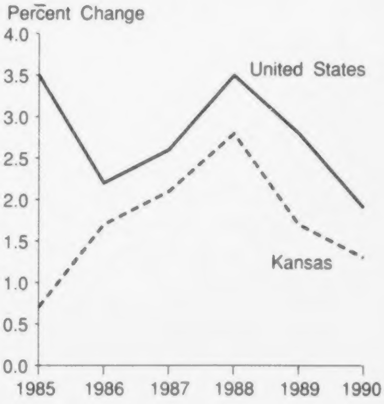
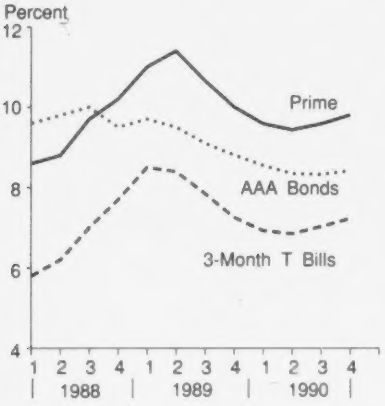
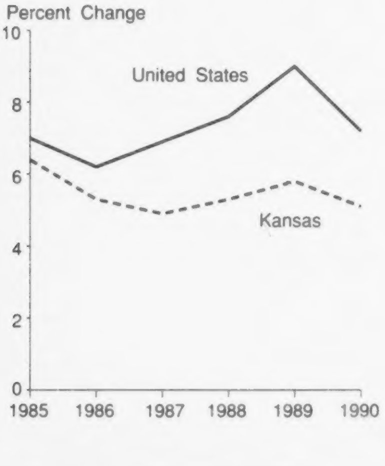


Figure 5
Interest Rates



throughout 1988 and early 1989, dropped significantly during that quarter. Since we assume that the Fed will continue to respond to a lessening of inflationary pressures and a weaker economy by relaxing its restraints on money supply growth, we forecast lower interest rates for 1990 than 1989. The three month treasury bill rate, at 7.0 percent, will on average be 1.0 percentage points lower than it was in 1989. The prime rate will be about 1.2 percentage points below 1989's 10.8 percent, while Moody's AAA bond rate will average 8.4 percent compared to 9.3 percent in 1989. Figure 5 illustrates the quarterly path of the interest rate forecasts. As the figure indicates, as the economy begins to gain strength and inflationary pressures intensify toward the end of the year, interest rates are expected to end their decline and even increase slightly.

Figure 6
Personal Income Growth



As economic growth slows, so does the growth of nominal personal income, from 9.0 percent in 1989 to 7.2 percent in 1990. This decline is seen mostly in three areas: labor income, both wages and salaries and other labor income, will grow 7.0 percent compared to 8.3 percent in 1989; interest income will grow 9.2 percent compared to 15.3 percent in 1989, because of lower interest rates; and proprietors' income will grow 4.0 percent compared to 8.0 percent in 1989. If we correct for inflation we get real personal income growth of 2.5 percent in 1990, compared to 4.6 percent in 1989. It is notable that real personal income growth in both 1989 and 1990 is significantly greater than the growth rate of real gross national product. This is explained by the fact that corporate profits (the relevant measure of the income to owners of corporations when calculating GNP) fell in 1989 and are expected to fall again in 1990, while corporations maintained and are expected to continue to maintain dividends (the relevant measure of income to owners of corporations when calculating personal income). The recent history and forecast of personal income growth is presented in Figure 6.

The Kansas Economy

The slowdown in national economic growth will be reflected in a slowdown in the growth of the Kansas economy. The overall picture for Kansas is shown in Table 1. Employment will grow at 0.7 percent in 1990, only half of its 1989 rate of growth. Since the labor force will continue to grow at about a 1 percent annual rate, the average unemployment rate will increase from 4.4 percent to 4.7 percent. Nonfarm wage and salary employment, which does not include farm employment, self-employed persons, or adjustments for those with more than one job, is also forecasted to grow more slowly in 1990 than in 1989. Figure 4 compares the recent history and forecast of nonfarm wage and salary employment for Kansas with that of the nation. Finally, growth of personal income in current dollars is expected to be lower by 0.7 of a percentage point in 1990.

The growth rate of employment in subsectors of the Kansas economy is shown in Table 2. Mining employment will continue to fall, although not as drastically as in the previous two years, as imported oil prices fail to reach a level that will call forth substantial new activity. After falling for two consecutive years, construction employment will grow slightly, as a result of lower interest rates and some increased level of activity in highway construction; the 1990 level of construction activity, however, will still be more than 6 percent below the 1987 level.

Employment growth in the manufacturing sector of the Kansas economy appears to be going against the trend for the rest of the economy. The growth rates for employment in durable and nondurable goods manufacturing shown in Table 2 translate into a 4.0 percent growth in manufacturing employment for 1990, compared to a 1.4 percent rate of growth in 1989. These figures are misleading, however, in that some of the contrast in the two years is caused by the Boeing strike that occurred in late 1989. The effect of the strike is to make the growth of manufacturing employment look unusually low in 1989 and unusually high in 1990. If we correct for the effects of the strike, the growth rate of manufacturing employment is computed to be 2.2 percent in 1989, and 3.3 percent in 1990.

The forecasted 1990 growth in employment in the durable goods portion of the manufacturing sector is nearly all due to growth in two subsectors: transportation equipment, and machinery, including electrical. Employment in transportation equipment manufacturing is forecasted to grow 5.4 percent in 1990, compared to 0.9 percent in 1989 (3.5 and 2.6 percent, respectively, after correcting for the effects of the Boeing strike). Much of this growth is due to good prospects for general aviation during 1990. Employment in manufacturing of machinery, including electrical, is expected to grow 7.6 percent in 1990, compared to 4.0 percent in 1989. The forecasted growth of this subsector contributes about 2 percentage points to the forecasted growth in durable goods

Table 1
Kansas Forecast Summary

	1988	1989	1990
Labor Force Growth	0.8	1.0	0.9
Employment Growth	0.9	1.4	0.7
Unemployment Rate	4.8	4.4	4.7
Nonfarm Wage & Salary Employment Growth	2.8	1.7	1.3
Nominal Personal Income Growth	5.3	5.8	5.1

employment. Turning to the nondurable goods portion of manufacturing employment we find that more than half of the forecasted growth is accounted for by growth in the printing and publishing subsector. Employment in printing and publishing, which is becoming an industry of growing importance for Kansas, is forecasted to grow 5.6 percent in 1990, after growing 2.6 percent in 1989.

The low rate of growth in employment in transportation, communications, and public utilities reflects a decrease in railroad employment for the sixth consecutive year, but the forecasted decrease in railroad employment is almost exactly offset by a forecasted 1.8 percent increase in trucking and warehousing employment. The slowdown in economic growth will be felt directly in slow growth of employment in wholesale and retail trade as personal income growth slows. The forecast calls for employment decreases of more than one percent in general merchandise stores and automobile dealers and gas stations, and slight increases in employment in food stores and apparel and accessory stores. The forecasted increase in employment growth in finance, insurance, and real estate will occur in spite of forecasted decreases in banking employment (-2.4 percent) and employment in insurance (-1.4 percent).

Following recent state and national trends, employment in services will continue to grow. Government employment in Kansas is expected to fall 1.7 percent in 1990, as both the federal and state and local governments face tighter budget constraints. Federal government employment will decline 3.9 percent, while state and local employment will decline 1.4 percent.

Table 2
Kansas Employment Breakdown (rate of growth)

	1988	1989	1990
Mining	-7.5	-6.1	-1.1
Construction	-7.0	-1.0	1.6
Nondurable Goods	0.6	0.8	2.6
Durable Goods	4.7	2.0	4.9
Transportation & Public Utilities	3.3	1.0	0.5
Wholesale & Retail Trade	1.5	1.6	0.5
Finance, Insurance & Real Estate	2.3	0.4	1.7
Services	4.8	4.1	3.1
Farm	1.3	-2.4	-2.9

The detailed breakdown of the Kansas nominal personal income forecast is shown in Table 3. The major factors leading to reduced income growth are reduced growth of income to labor, both wages and salaries and other labor income, and reduced growth in dividends interest in rents. The reduced growth in total income to labor, from 6.1 percent in 1989 to 5.1 percent in 1990, is due to the slowdown in economic growth in general, and the slowdown in employment growth in particular. The reduction in growth of property income is due almost entirely to the reduction in interest income growth that follows from lower interest rates. Because of inflation, the growth of personal income in real (purchasing power) terms will be much smaller than its growth in nominal terms. There is no price index for Kansas, but we can get some idea of the size of real personal income growth by deflating the GNP personal consumption deflator for the U.S. When we do so we find that real personal income in Kansas is forecasted to grow only 0.6 percent in 1990, compared to 1.2 percent in 1989. Figure 6 compares the recent history and forecast of personal income growth for Kansas with that of the nation.

Conclusions

Although growth of both the national and Kansas economies will slow significantly in 1990, the probability of a recession is felt to be relatively low. There are two main ways in which the economy could enter a recession: policy makers could, either intentionally or unintentionally, push the economy into a recession, or some shock to the economy could move it into a recession.

The chances that the economy will move into a policy-induced recession during 1990 seem remote. The presence of extreme inflationary pressures would seem to be the only stimulus that would cause the Fed to intentionally move the economy into a recession, but there is no reason to expect such extreme inflationary pressures to surface in the near future. Internally, such pressures could be a result of strong aggregate demand, or very high expectations of inflation, or both, but aggregate demand appears to

Table 3
Kansas Personal Income Breakdown
(rate of growth)

	1988	1989	1990
Personal Income	5.3	5.8	5.1
Wages and Salaries	5.9	5.9	5.1
Nonfarm Proprietors' Income	4.6	4.2	2.5
Farm Proprietors' Income	-12.0	-22.0	2.0
Dividends, Interest & Rents	7.8	9.9	6.0
Personal Cont. to Social Ins.	11.0	9.2	10.8
Transfer Payments	6.1	7.3	7.7
Other Labor Income	6.0	8.0	5.2

be softening, and the recent history of only moderate inflation coupled with what appears to be the Fed's recent successes in limiting inflation suggest that economic agents will expect future inflation to be moderate. Externally, inflationary pressures could be aggravated by, for example, a big increase in imported oil prices, but again, there is no reason to think that the likelihood of such an event is great.

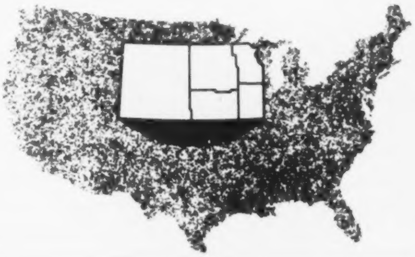
It does not appear likely that an external shock will force the economy into a recession. We must keep in mind, of course, that as growth of the economy slows, it takes less of a shock to push the economy into a recession; however, our forecast of 2.1 percent growth, though not robust, suggests enough strength that moderate shocks will not be sufficient to lead to recession. Thus, although we cannot completely discount the possibility of recession in 1990, we conclude that the likelihood of such an occurrence is small.

Notes

1. The forecasts of the national economy are produced by the Econometric Model of the United States using assumptions generated at the Institute. This model was developed at the Center for Econometric Model Research at the University of Indiana, R. Jeffery Green and Morton J. Marcus, directors. The Kansas forecasts are produced by the Kansas Econometric Model, which is a product of the Institute for Public Policy and Business Research at the University of Kansas.

2. Organization for Economic Cooperation and Development. Member nations are Australia, Austria, Belgium, Canada, Denmark, Finland, France, West Germany, Greece, Holland, Iceland, Ireland, Italy, Japan, Luxembourg, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

The 1990 Kansas and U.S. Economic Forecasts



M. Jarvin Emerson

Dr. Emerson is a professor in the Department of Economics at Kansas State University. The forecasts that appear in this article were made in October 1989 and provided the basis for the state government revenue forecasts made by the Consensus Revenue Estimating Group at its November 1989 meeting. They also appear in *The Governor's Report on the State of the Kansas Economy*. That report also contains a review of the recent performance of the Kansas economy by industry and region.

The National Economy

The growth of the United States economy, which slowed during the past year, will continue to decelerate during 1990. All of the major gross national product (GNP) components will contribute to the slowdown as they grow at a reduced rate. Although the probability of a recession has increased, the economy appears to have enough momentum to generate a small, but positive, real growth rate. Real GNP is forecast to grow at a 1.5 percent rate after registering an estimated 2.9 percent growth in 1989 (Table 1).

While a surge in interest income, coupled with steady employment growth, propelled the rise in personal income and consumption in 1989, neither factor will provide a similar contribution to the consumer sector in 1990. Lower interest rates will slow the growth of interest income, and sluggish employment growth

Table 1
1990 U.S. Forecasts

	Percent
Real GNP growth	1.5
CPI Increase	4.5
Employment growth	1.2
Unemployment rate	5.5
Personal income growth	6.0

will offset much of the rise in wages and salaries.

Real personal consumption expenditures will grow at a 1.8 percent rate, down from a 2.7 percent gain in 1989. Durable goods expenditures will edge up only 1 percent after adjusting for price increases. The major drag on the growth rate of durable goods is an anticipated slowdown in automobile sales, which are forecast to decline by 2 percent in real terms in 1990. Other durable goods purchases will fare better, particularly furniture and appliances, with a forecasted increase of nearly 4 percent in real terms.

Expenditures of nondurable goods will also increase at a modest 1 percent pace after adjusting for inflation. The growth rate will be even lower for food expenditures and gasoline purchases. Expenditures on services will rise more rapidly than total personal consumption expenditures, with a 2.8 percent advance in real terms. The largest increases are expected to be for expenditures for electricity and natural gas and for expenditures for medical services.

With an expected slowdown in final demand and a lower capacity utilization rate, business investment is forecast to slow to a modest 1.5 percent growth rate in 1990, after recording 8.4 and 3.4 percent expansions in 1988 and 1989, respectively. Among the major business fixed-investment categories, nonresidential structures (particularly in the mining and petroleum industry) will register the only expansion. Pollution abatement equipment expenditures, mostly mandated, will continue to rise at a rate above 9 percent. After robust increases of 10.5 and 8.6 percent in 1988 and 1989, respectively, investment in plant and equipment will edge up only 1.5 percent in 1990. The largest decrease will occur in nonmanufacturing industry plant and equipment investment, which is forecast to increase only 1 percent after nearly a 9 percent advance the past year. The manufacturing sector will add a modest 2.4 percent to its stock of plant and equipment. Only the fabricated metals, textiles, and petroleum sectors are expected to accelerate their purchases of plant and equipment.

Residential construction is the one area of investment spending that is expected to show greater strength in 1990, with a 4.7 percent advance following a decline in 1989. Lower interest rates will increase the demand for homes and encourage more construction activity.

A slower rate of increase in government spending will also contribute to a slowdown in the economy. Expenditures by state and local governments in constant dollars are projected to rise 1.1 percent in 1990, less than half the 1989 rate of increase. Although under pressure from the federal government to fund numerous social programs, state and local governments will have difficulty accommodating much additional overall spending because the weaker economy has reduced the rate of revenue growth. Real expenditure increases by the federal government, which represent 23 percent of GNP, are forecast to fall 1.8 percent following a 3.5 percent rise last year. Defense expenditures will decline for the second consecutive year in real terms while nondefense purchases will increase. If spending and receipts occur as forecast, the federal budget deficit will shrink by about $10 billion to $146 billion in fiscal year 1990 as measured in the national income and product accounts.

The growth in both real exports and imports will slow in 1990. Exports are expected to increase more rapidly than imports thereby reducing the negative trade balance. The export of capital goods and industrial supplies and materials will continue to register strong increases. No gain is expected in the export of food and feed products, but sizeable import expansion will continue for automobiles and consumer goods.

Although real economic growth is forecast to slow appreciably in 1990, the rate of inflation will moderate only slightly. The 1990 rate of inflation, as measured by the consumer price index, is forecast to be 4.5 percent compared with an estimated 4.8 percent in 1989. Lower productivity growth and rising wages will contribute to the 1990 price level increase. Unit labor costs, which jumped 4.6 percent in 1989, are forecast to rise again at the same rate in 1990.

Interest rates will continue to move lower as the Federal Reserve gradually relaxes its tight monetary policy which pushed interest rates appreciably higher in 1989. Both short-term and long-term rates in 1990 are expected to average 0.8 to 1.0 percentage points below the 1989 average.

Compared with recent history, the outlook for oil prices appears to be more stable; however, any OPEC accord seems at best to be fragile with extensive cheating on quotas. With new export capacity coming on line, the increased output will tend to exert a downward pressure on price.

A slower rate of growth of the U.S. economy will produce weaker employment growth and a higher unemployment rate. The 1990 unemployment rate is forecast to rise to an average of 5.5 percent from an average of 5.2 percent in 1989. The increase in unemployment will be concentrated in construction and durable goods manufacturing. The rate of increase in employment will be half of the 1989 rate at 1.1 percent.

The above forecasts for the national economy were made in the late Fall of 1989 when there were concerns about a potential recession; conflicting data and uncertain policy direction complicated the outlook. The "soft-landing" being engineered by the Federal Reserve in an attempt to cool the economy without creating a recession appeared to be working; however, oscillations in key data series such as industrial production, retail sales, international trade, and housing, created uncertainty about the direction of the economy.

The Kansas Economy

The factors slowing the national economy will also impact the Kansas economy in 1990. In every year since the 1982 recession the growth of the Kansas economy has been below that of the nation; the outlook for 1990 is for a continuation of that pattern (Table 2).

Kansas personal income is forecast to grow 4.6 percent, down from an estimated 5.4 percent growth in 1989.

Table 2
1990 Kansas Forecasts

	Percent
Gross state product growth	4.7
Personal income growth	4.6
Employment growth	0.8
Unemployment rate	5.0

This is the lowest growth rate since 1983 when Kansas personal income grew only 3.6 percent. The 4.6 percent growth rate is only 0.1 percent above the inflation rate forecast, thereby implying almost zero real growth.

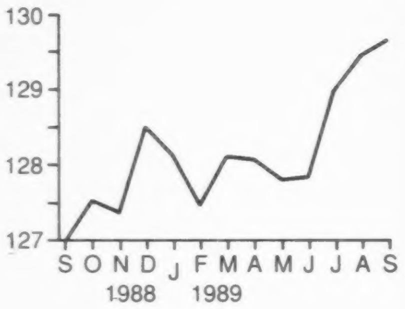
Employment will grow only 0.8 percent, down from a 1.4 percent gain in 1989. Largest employment increases will occur in the service sector; wholesale and retail trade employment will be moderately higher. Durable goods manufacturing employment, which grew more rapidly than overall state employment in 1989, will experience little growth as the slowdown in the national economy and weaker exports diminish the growth of industries in this sector. The automobile manufacturing industry is forecast to weaken significantly along with machinery manufacturing. The aircraft manufacturing industry, particularly Boeing, has a huge backlog of orders which should provide a boost to employment in that industry unless Boeing restructures its operation in such a way as to diminish the importance of its Wichita division in its production plans. Stable crude oil prices above $18 per barrel and modestly higher natural gas prices will bring increased activity in the mining sector and moderate employment gains.

Kansas personal income will grow at a slower pace, increasing 4.6 percent in 1990, following an estimated 5.4 percent rise in 1989. With a forecasted inflation rate of 4.5 as measured by the consumer price index, the growth in Kansas personal income in real terms will be close to zero (Table 3).

Wages and salaries, which account for about 53 percent of total Kansas personal income, are forecast to increase 4.52 percent; an anticipated softening in the manufacturing and construction sectors will be the primary sources of the slower growth rate. Increased wage and salary payments in mining and services will partially offset sluggishness elsewhere. Other labor income will grow only 3.34 percent, and nonfarm proprietors' income will rise 3.03 percent. Expected lower prices will more than offset higher production, resulting in a decline in net farm proprietors' income of 3.61 percent.

The income category of dividends, interest, and rent will increase more rapidly than total personal income at 5.27 percent, but well below the 9.46 percent advance in 1989. The primary component is interest income, which accounts for about 85 percent of this income category and most of its growth, because rental income and dividends will be little changed.

Figure 1
Kansas Index of Leading Economic Indicators



Transfer payments will reflect the slowdown in the economy and increase 7.72 percent. The residence adjustment, which accounts for income earned by Kansas residents from out-of-state sources, will increase 4.42 percent, and social insurance contributions will jump 7.62 percent. Gross state product, a measure of the value of goods and services produced in the Kansas economy, is forecast to rise 4.7 percent.

As an additional barometer of the Kansas economy, a Kansas index of leading economic indicators is released monthly. This index is a composite of eight data series, seven of which are specific to Kansas. The seven Kansas series are wheat prices paid to Kansas farmers, cattle prices paid to Kansas farmers, stock prices of about 100 Kansas-based or Kansas-related companies, new housing units authorized for construction in Kansas, initial claims for unemployment insurance in Kansas, and average weekly hours worked in manufacturing industries in Kansas. In addition a measure of the nation's money supply, M2, is included. Figure 1 indicates the performance of this index over the last twelve months. Although the index raised concerns by falling six times during this period, it turned up again before a sufficient number of declining index values occurred to signal a recession.

Table 3
Kansas Total Personal Income (in thousands of dollars)

	1988	Forecast for 1989	% Change 1988-89	Forecast for 1990	% Change 1989-90
Wages and Salaries	21,035,834	22,137,951	5.24	23,139,147	4.52
Other Labor Income	2,046,087	2,150,947	5.12	2,222,816	3.34
Proprietors' Income					
Farm	1,208,851	996,287	-17.58	960,287	-3.61
Nonfarm	3,065,300	3,202,048	4.46	3,298,917	3.03
Dividends, Interest, and Rent	7,274,127	7,962,293	9.46	8,382,093	5.27
Transfer Payments	5,450,068	5,800,201	6.42	6,248,122	7.72
Adjustment for Residence	1,052,935	1,112,756	5.68	1,161,968	4.42
Less: Social Insurance Contr.	(1,812,833)	(1,924,036)	6.13	(2,070,611)	7.62
Total	39,320,369	41,438,447	5.39	43,342,738	4.60

Kansas Agricultural Outlook

James Mintert
William I. Tierney, Jr.
Allen M. Featherstone

James Mintert and William I. Tierney, Jr. are Extension agricultural economists in marketing, and Allen M. Featherstone is an assistant professor in agricultural economics, all at Kansas State University.

During 1989, the Kansas agricultural economy moved another year away from the stress of the early 1980s. Although the 1988-89 drought reduced production in the crop sector and forced some cattle herd liquidation, government payments and crop insurance indemnities helped shield aggregate farm income from the full impact of the drought. Kansas farm income is expected to rebound in 1990 with most of the recovery occurring in the crop sector, and the expected increase in income will provide a foundation for another increase in land prices. Kansas farmland prices increased by roughly 7 percent during the last year and should increase by 6 to 9 percent during 1990. The income and land price projections assume that Kansas farmers will face normal weather patterns during 1990; if a drought occurs during 1990, crop and livestock income, and land forecasts, would all be reduced.

This overview of the 1990 Kansas agricultural economy is broken down into its two primary activities: livestock and crop production. Expected returns for crops and livestock are the basis for the Kansas land price outlook in the concluding section.

Livestock Outlook

The livestock sector continues to be an important component of the Kansas agricultural sector. According to Kansas Agricultural Statistics, nearly 65 percent of Kansas farmers' gross receipts came from the livestock sector during 1988 (the most recent data available). Cattle generate the bulk of the livestock industry's revenue, so the overall profitability of the cattle industry affects aggregate returns for Kansas agriculture more significantly than returns earned by other livestock enterprises in Kansas, including hogs. For example, in 1988 cattle sales provided Kansas farmers with nearly 58 percent of all crop and livestock receipts, whereas sales from hog enterprises were responsible for approximately only 4 percent.

Returns to management and labor during 1989 were below those of 1988 for many Kansas livestock farmers and feeders. Cattle feeders found profits elusive during most of 1989, continuing the pattern begun during the last half of 1988. Although prices for steers fed to slaughter weight averaged roughly 4 percent higher in 1989 than during 1988, feed costs and the cost of replacement feeders were also high, causing many cattle feeders to either lose money or just barely break even.

Stocker operators fared somewhat better than cattle feeders during 1989, although they too felt the pinch of higher feed costs, particularly during the winter and early spring. Summer grazing programs benefitted from the increase in rainfall that began in mid-spring. Many grazing programs earned returns of $20 to $40 per head in 1989, partly because of the weakness in feeder cattle prices during the spring when many grazers were purchasing cattle to be placed on pasture.

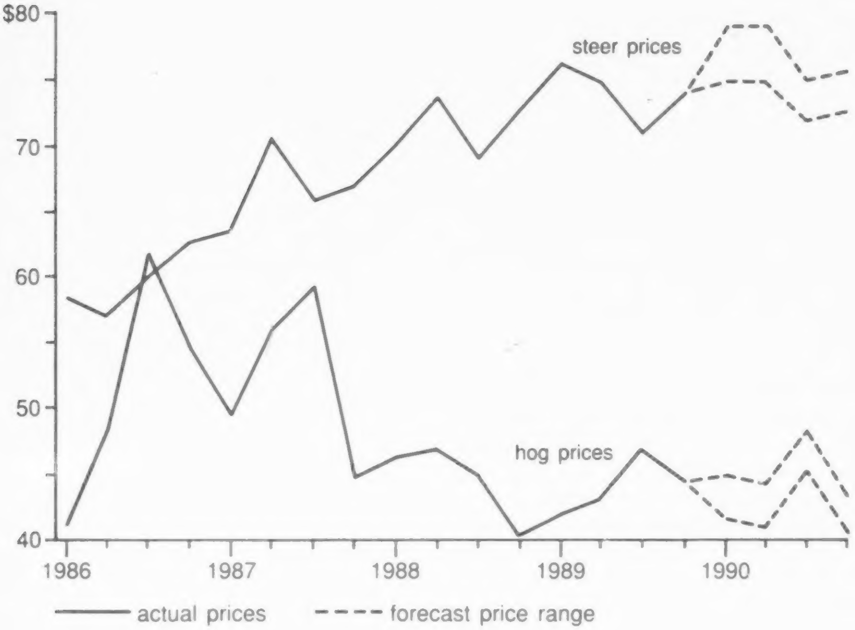
Cow-calf operators, whose returns tend to vary greatly, had another good year in 1989 because of the variability in costs among operators; however, most operators cash returns exceeded cash costs in 1989 for the fourth year in a row. Unfortunately, the drought forced some cow-calf producers to liquidate either a portion of or, in some cases, all of their cow herd, thereby preventing them from participating in 1989's favorable price levels. The positive returns in the cow-calf sector are fueling expectations that an expansion in the beef herd is beginning and will continue into the early 1990s. Although rapid expansion implies larger beef supplies, it would reduce 1990 slaughter cattle supplies as producers retain breeding animals for expansion purposes.

Like cattle feeders, most hog farmers lost money during the first half of the year. By mid-year, however, prices for slaughter hogs had risen and feed costs had declined to the point where most Kansas hog operations were either breaking even or operating in the black. Returns were boosted above even the most optimistic of projections during late summer and early fall when, despite the availability of larger pork supplies than during the comparable period of 1988, hog prices shot up to the high $40s and to $50 per hundredweight at terminal markets such as Omaha and Kansas City. As a result, Kansas hog producers found themselves making money during the latter stages of the summer quarter and first half of the fall quarter.

The hog price outlook for 1990 is somewhat more uncertain than normal. Hog prices during much of the last half of 1989 were stronger than expected based on available supplies of pork and competing meats. Although some of the price strength was attributable to narrow price spreads from the retail to the farm level and a reduction in the net imports of pork products, a portion of the price strength remains unexplained. At this point, it is not clear whether the strength in hog prices will continue into 1990.

Pork supplies during the first half of 1990 are expected to be slightly below the first half of 1989. Cash hog prices at Omaha during the first six months of 1990 are likely to average $42 to $45 per hundredweight (Figure 1). This estimated price range compares to an average of $42.68 during the first half of 1989. Hog slaughter during the last half of 1989 is likely to wind up modestly below the first half, with most of the slaughter reduction occurring during the summer quarter. Omaha cash hog

Figure 1
Kansas Steer and Hog Prices, 1986-1990



Note: Steer prices shown are those offered by western Kansas meatpackers for 1,000 to 1,300 pound steers. Hog prices are those offered for 210 to 240 hogs in the Omaha market. Fourth quarter 1989 prices are partially estimated.

Source: Kansas State University Extension Agricultural Economics.

prices are expected to increase during the last half of the year compared to the first six months of 1990, averaging from $44 to $48 per hundredweight. If the trend of stronger prices continues into 1990, prices are likely to average slightly higher than those currently forecasted, particularly during the last half of the year.

Total cattle slaughter during the first half of 1990 is likely to average 2 to 3 percent below slaughter during the first half of 1989. The largest supply reduction is expected during the last half of the first quarter and first half of the spring quarter. Fed steer prices in western Kansas are expected to average from $75 to $79 per hundredweight with weekly average prices climbing to $80 or better for a portion of this time period. During the last half of 1990, cattle slaughter should wind up near that of 1989's last two quarters as fed cattle marketings begin to increase. Western Kansas fed steer prices are likely to average in the low to mid-$70s per hundredweight during July through December, 1990.

Profitability for many Kansas livestock producers will be similar in 1990 to that experienced in 1989. Operating margins for most cattle feeders will remain tight, with returns running in the red for at least a portion of the upcoming year, despite the fact that the fed-steer average price during the first half of 1990 is likely to be record high. Although feed grain prices are expected to decline somewhat and improve cattle feeding returns, prices for replacement feeders should increase enough to offset the impact of the grain price decline. Cow-calf operators may have another good year in 1990. Herd rebuilding is expected to get underway in earnest during 1990, but is not expected to have a significant impact on calf supplies until at least 1991. Hog producers should benefit from lower feed costs which will drop price levels sharply from those in 1989; therefore, most Kansas hog farmers will operate at or above break even levels throughout most of 1990. Returns to hog producers are expected to peak during the summer quarter.

Crop Outlook

Projections for 1990 crop income for Kansas are based on the announced set-aside acreage required for participation in the federal government's 1990 wheat and feed grain programs. The major crops produced in Kansas (in order of their market value in 1989) are feed grains (corn and grain sorghum), wheat, hay, and soybeans. For each crop grown in Kansas, participation in government programs, yields, acreage harvested, market prices, and government payments must be forecasted.

To a large extent, Kansas farmers' crop income is insulated from changes in market prices. Farmers receive additional income from government price supports (the regular loan program), income supports (deficiency payments), disaster relief and insurance indemnity payments, as well as payments for cropland placed in the ten-year Conservation Reserve Program (CRP). Wheat and feed grains generate nearly two-thirds of Kansas' crop income. Most Kansas wheat and grain producers comply with the government set-aside programs and are therefore eligible for deficiency payments. These payments rise in years when prices are low and fall in years when prices are high; therefore, crop income varies mostly because of changes in the size of the government set-aside, although yields are also an important factor. In 1990, the government will permit farmers to harvest 7.5 percent more acres of wheat and 5 percent more acres of feed grains; some crop producers will stay out of the government program and sharply increase their acreage. Similar increases in acreage are expected in other states and, if national

Table 1
Estimated Kansas Crop Income

	1988	1989	1990
Acres harvest (x 000)	18,935	18,188	19,630
Acres enrolled in Conservation Reserve Program (x 000)	2,381	2,890	3,190
Market value of crops[#] (x 000,000)	$2,861	$2,341	$2,846
Other Crop Income[*] (x 000,000)	$1,128	$ 681	$ 690
Total crop income (x 000,000)	$3,989	$3,022	$3,536

# A large portion of the state's feedgrain and hay production is not sold for cash but fed to livestock.

* Deficiency, Disaster, and CRP payments as well as Crop Insurance Indemnity payments.

Source: Kansas State Board of Agriculture *1988 Farm Facts*, August 1989, and other sources.

average yields are in line with trend projections, the resulting increases in production could lead to lower market prices in 1990.

The crop income forecasts for 1989 in Table 1 are based on the following assumptions:

1. the number of farmers participating in 1990 programs will be nearly the same as in 1989;
2. the federal government will not change how acreage is earmarked for specific crops (both for set-aside and production) for farmers participating in federal programs;
3. yields will correspond to normal trends;
4. reduced federal set-aside requirements for 1990 will result in expanded crop acreage, increased production, and lower market prices;
5. other payments will be relatively unchanged.

The increase in overall production plus government income support payments should result in a 17 percent increase in Kansas gross crop income. Increases in input costs in 1990 will notbe large enough to offset increases in gross crop income; therefore, net crop income is likely to be 10 to 15 percent larger in 1990 than in 1989. Additional good news for the state economy is that the increase in harvested crop acres of nearly 8 percent should result in significant increases in activity in the state's input supply, grain merchandising, and output processing industries.

Agricultural Land Outlook

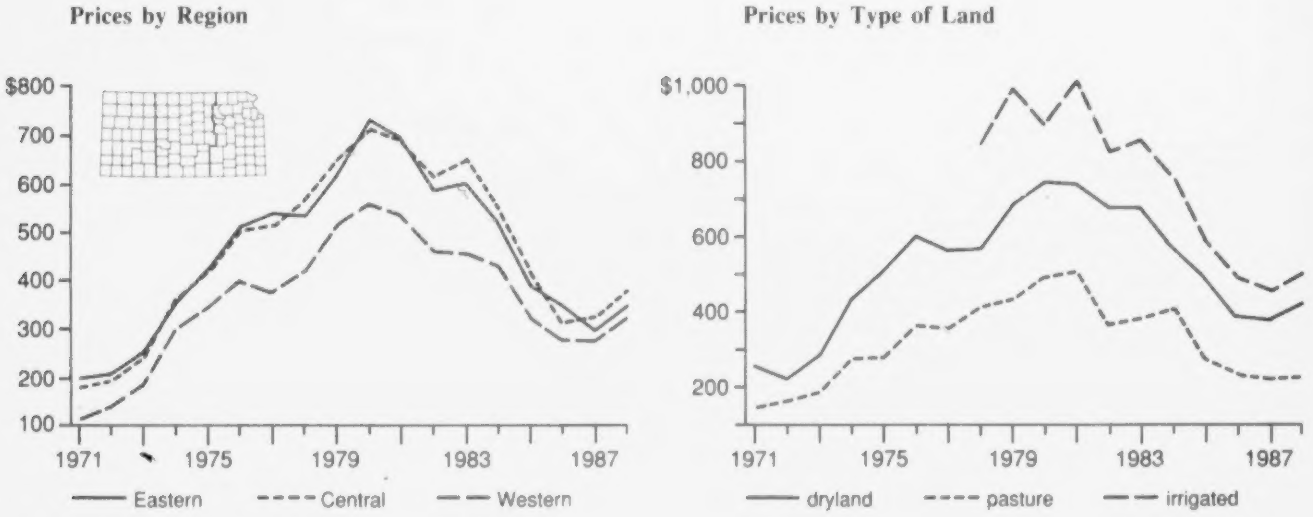
Land values in Kansas apparently bottomed out in 1987 signalling an end to the farm crisis. Figure 2 illustrates average land values in Kansas for irrigated cropland, dryland cropland, and pasture. The data are from actual sales data reported by members of the Kansas Society of Farm Managers and Rural Appraisers. Kansas nominal land values are about 10 to 12 percent higher today than they were at the bottom of the market; current land prices are about equal to those of 1974. Regional land values are also shown in Figure 2; land values in each region of the state peaked during 1980. Land values in the eastern, central, and western part of the state are roughly 45 percent, 50 percent, and 55 percent of their respective 1980 values. Land values in the central part of the state have increased by roughly 20 percent over the most recent two year period.

Despite the drought, Kansas land values increased from Sept. 30, 1988 to Sept. 30, 1989. The Federal Reserve Bank of Kansas City reported that Kansas land values went up 7.1 percent for irrigated cropland, 3.2 percent for dryland cropland, and 4.7 percent for pasture, during the twelve-month period.

The Kansas State Board of Agriculture reports that cash rents for irrigated land were higher in 1989 than in 1988, while cash rents for dryland and pasture were lower in 1989 than in 1988. The current rent to value ratios, although closer to their long-run averages of 3 to 5 percent than a year ago, are still above the historical norm; as a result, the rent-to-value ratio is expected to decline further in 1990. A declining rent-to-value ratio implies that either the rent to farmland must fall or the price of farmland must increase. Since crop income is expected to increase, it is unlikely that farm rents will fall, suggesting that land values will continue to increase at a rate slightly higher than the rate of inflation for another year. The rate of increase is expected to range from 6 to 9 percent during 1990. The more substantial price increases are likely to occur in irrigated cropland, while pasture land will probably lag behind.

Several factors could alter this land price forecast. Real (adjusted for inflation) interest rates, the rate of inflation, and commodity prices merit special attention during 1990. A continued fall in the real interest rate would speed the increase in land values. If the economy continues to grow rapidly, and 1990 inflation turns out to be higher than the 4 to 6 percent expected, land values will also grow faster. Within the agricultural sector, decreasing commodity prices resulting from more normal crop yields and increasing acreage could have a large impact on Kansas land values. The 1990 Farm Bill also may impact Kansas land prices. If the Bill changes little from the current law, the effect on land price will likely be negligible; however, if the Farm Bill changes greatly, the effect on land values could become significant.

Figure 2
Kansas Farmland Prices, 1971-1988
(dollars per acre)*


Prices by Region

Prices by Type of Land

*weighted average

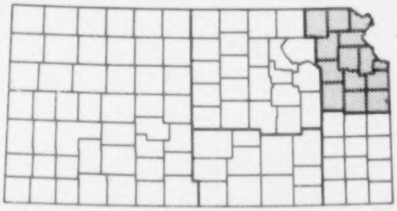
Source: Kansas Society of Farm Managers and Rural Appraisers.

Summary

The Kansas agricultural economy is expected to rebound in 1990 from its drought depressed level of 1989. Kansas farmers income will recover, primarily in the crop sector because of the production shortfall. Assuming normal weather, harvested crop acreage is expected to increase sharply in 1990 and yields, particularly for wheat, are also expected to be sharply higher. The increases in acreage and yields are not only expected to increase farm income, but are also likely to provide a boost to the Kansas agricultural input supply, grain merchandising and output processing sectors.

Income from the livestock sector during 1990 will probably be relatively close to that of 1989. Cattle feeding margins are expected to remain tight, whereas cow-calf producers should find calf prices above their break-even level for the fifth year in a row. Hog producers should find 1990 a more favorable year than 1989 as a modest reduction in pork supplies is expected to provide a small boost to cash hog prices at the same time that feed grain prices fall below their 1989 levels.

Kansas farmland prices are expected to increase for the third year in a row with an increase of between 6 and 9 percent. Several factors provide a solid foundation for another year in price increases: these include a recovery in Kansas farm income, a projected lowering of real and nominal interest rates, and continued growth in the inflation rate. However, a severe drought or an unexpected increase in interest rates could reduce the expected increase.



Northeast Kansas
Signs of a Slowdown

Robert Glass

Robert Glass is a research economist at the Institute for Public Policy and Business Research.

Northeast Kansas Forecast

The 1990 northeast Kansas outlook is for less growth than in the previous two years, but the region's growth rate will still be greater than those of the U.S. and Kansas economies. In 1990, northeast Kansas' total nonfarm wage and salary employment[1] is projected to grow at a 2.5 percent rate, down from a 3.7 percent growth rate in 1989 and a 5.1 percent growth rate in 1988.

A brief glance at Figure 1 indicates that for every year since 1986, the northeast region of the state has had a higher growth rate than either the U.S. or Kansas. From 1985 to 1989 total employment has increased 17.1 percent in the region, 11.2 percent in the U.S., and 8.6 percent in Kansas; however, since 1988 the gap between the growth rate for the northeast region and the growth rate for both the U.S. and Kansas has declined each year.

A more detailed 1990 forecast for northeast Kansas is provided in Table 1. The two leading growth sectors in the region are finance, insurance, and real estate (F.I.R.E.), with a growth rate of 5.3 percent, and the service industries, with a growth rate of 4.8 percent. The weakest sectors are transportation, communication, and public utilities (-0.3 percent growth rate); government (0.6 percent growth rate); and manufacturing (0.7 percent growth rate). Both mining and construction (2.1 percent growth rate) and wholesale and retail trade (2.9 percent growth rate) are expected to grow moderately in 1990, although their expected growth rates are down from last year. In fact, every sector's growth rate is expected to be less in 1990 than in 1989.

The forecast for northeast Kansas was generated by using econometric forecasting techniques, but because of the diversity of economic phenomenon in the region, a single model for the entire region was not used. The next section of this article will consist of a brief explanation of how the northeast Kansas forecast was produced using subregional models, and the following four sections will be comprised of a description and analysis of the four subregional forecasts. A few tentative conclusions concerning the forecast are incorporated in the final section.

Table 1
Northeast Kansas Nonfarm Wage and Salary Employment Forecasts (in thousands)

	1988	1989	% Change 1988-89	1990	% Change 1989-90
Total	433.5	449.6	3.7	460.9	2.5
Mining and Construction	22.8	23.6	3.5	24.1	2.1
Manufacturing	58.0	59.2	2.1	59.6	0.7
Transp., Comm., and Pub. Util.	28.5	28.6	0.4	28.5	-0.3
Wholesale and Retail Trade	115.9	120.5	4.0	124.0	2.9
FIRE	30.7	32.3	5.2	34.0	5.3
Services	94.4	99.3	5.2	104.1	4.8
Government	83.2	86.1	3.5	86.6	0.6

Creation of the Forecast

The northeastern portion of Kansas is the most urban region of the state, due to its having three metropolitan areas: Kansas City, Lawrence, and Topeka. As a result, northeast Kansas has more people than any other region, although it is one of the smallest in terms of land area; however, the economies of the fourteen counties which constitute northeast Kansas are different, for they vary widely in the relative size and the sectorial composition of their economies. Brown, Nemaha, and Doniphan counties have a low population density and are primarily agricultural; Atchison and Franklin counties are agricultural with a small city located in each; Johnson, Leavenworth, Miami, and Wyandotte counties are part of a large metropolitan economy; Jackson, Jefferson, Osage, and Shawnee counties are a medium size metropolitan area which contains the state capitol and is dominated by all the ensuing bureaucracy; finally, Douglas County is a small metropolitan area

Figure 1
Northeast Kansas Nonfarm Wage and Salary Employment Growth

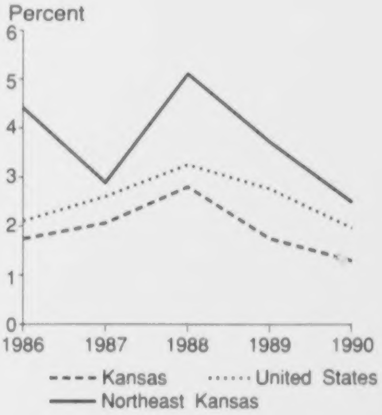
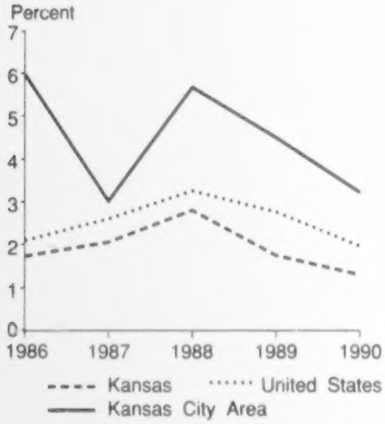


Figure 2
Kansas City Kansas Area Nonfarm Wage and Salary Employment Growth



obscured by a large state university.

Rather than build one econometric model for the whole region, four separate econometric models were created to forecast the economic performance of four subregions within northeast Kansas. These subregions are:

1. Kansas part of the Kansas City SMA: Johnson, Leavenworth, Miami, and Wyandotte counties;
2. Northern Tier: Atchison, Brown, Doniphan, and Nemaha counties;
3. Lawrence area: Douglas and Franklin counties;
4. Topeka area: Jackson, Jefferson, Osage, and Shawnee counties.

The subregional models forecast employment for seven major sectors: mining and construction; manufacturing; transportation, communication, and public utilities; wholesale and retail trade; F.I.R.E.; services; and government. The seven sectors are subsequently added together to give total employment for each subregion; the subregional forecasts are then combined to produce the northeast Kansas forecast.[2]

Even though total nonfarm wage and salary employment does not represent all of a county's economy, at the state level it accounts for about 85 percent of total Kansas employment.[3] Two constraints make nonfarm wage and salary employment the preferable basis for subregional econometric models: first, the data set is the best county-level data available, because it is relatively up-to-date, reliable, detailed, and comparable with data used in the Kansas Econometric Model; second, the nonfarm sector is much more amenable to forecasting with economic variables than the farm sector. The farm sector is dependent on a number of noneconomic variables, such as government farm programs and weather, which are nearly impossible to forecast with any precision.

Kansas City Kansas Area Forecast

Although the forecast for the KCK area is not as optimistic as the subregion's performance for the past two years, 1990 is still expected to be a good year, and the area's employment growth rate for 1990 is projected to be 3.2 percent, more than a full percent higher than the U.S. expected growth rate and nearly two and half times the Kansas expected growth rate. Figure 2 illustrates the extent to which the KCK area has consistently outperformed both the U.S. and Kansas economies since 1986, demonstrating how it grew 20.5 percent from 1985 to 1989 while the U.S. grew 11.2 percent and Kansas grew 8.6 percent.

Table 2
Kansas City Kansas Area Nonfarm Wage and Salary Employment Forecasts (in thousands)

	1988	1989	% Change 1988-89	1990	% Change 1989-90
Total	280.9	293.5	4.5	303.0	3.2
Mining and Construction	16.8	17.5	4.2	18.2	4.0
Manufacturing	39.2	40.4	3.1	41.0	1.5
Transp., Comm., and Pub. Util.	19.2	19.3	0.5	19.5	1.0
Wholesale and Retail Trade	79.2	82.9	4.7	86.1	3.9
FIRE	21.5	22.9	6.5	24.3	6.1
Services	61.9	65.8	6.3	69.5	5.6
Government	43.1	44.7	3.7	44.4	-0.7

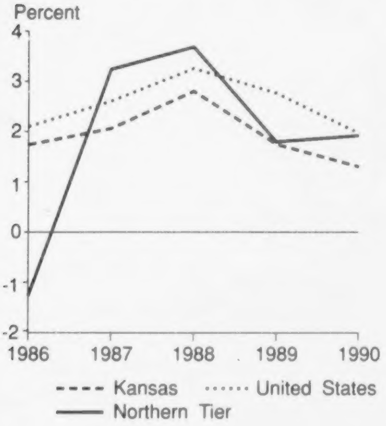
The detailed breakdown of KCK area forecast is provided in Table 2. Only the governmental sector is expected to decline in 1990, due to the anticipated minimal growth of federal government employment and the decline of Kansas state and local government employment. The moderation in the predicted growth of mining and construction employment is a result of the expected decline in the growth rates of both GNP and the KCK area economy, excluding the mining and construction sector. The decline in the growth rates of manufacturing, F.I.R.E., and transportation, communication, and public utilities employment is also due to the expected decline in 1990 of the GNP growth rate. The forecast of modest declines in the growth rates of wholesale and retail trade and service industry employment is the result of the expected restrained growth of the other sectors of the KCK area economy.

Northern Tier Forecast

Northern Tier total employment is anticipated to grow in 1990 at a rate of 1.9 percent, the same as in 1989. This is slightly lower than the expected growth rate for the U.S., but higher than the expected growth rate for Kansas. The Northern Tier's economic performance over the past five years has been sporadic but generally worse than either the U.S. or the Kansas economies (see Figure 3). From 1985 to 1989, Northern Tier total employment grew 7.5 percent as compared to the U.S. growth of 11.2 percent and Kansas growth of 8.6 percent.

Table 3 provides a more detailed 1990 forecast for the Northern Tier. Four of the major sectors are not expected to change in 1990: mining and construction; transportation, communication, and public utilities; F.I.R.E.; and government. The forecasted growth in manufacturing is due to the expected growth in Kansas

Figure 3
Northern Tier Nonfarm Wage and Salary Employment Growth



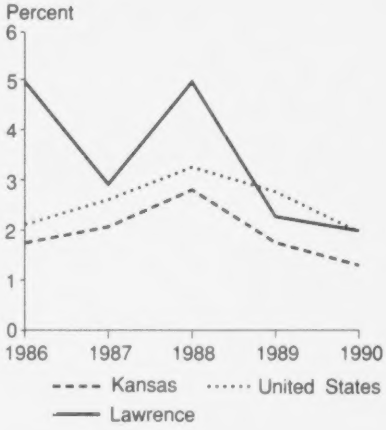
durable goods manufacturing, and the forecasted growth in wholesale and retail trade is due to the growth in Northern Tier employment in other sectors last year and the anticipated continued growth this year. The envisioned growth in the service industry's employment is also a response to last year's growth in the subregion's employment.

Lawrence Area Forecast

The 1990 forecast for Lawrence area employment represents only a slight decline from the 1989 growth rate and is the same as the U.S. employment forecasted growth rate. As Figure 4 indicates, except for 1989, when the Lawrence area outperformed Kansas but grew more slowly than the U.S., since 1986 the subregion has usually outperformed both the state and the nation. From 1985 to 1989 the Lawrence area grew 15.8 percent while the U.S. grew 11.2 percent and Kansas grew 8.6 percent. Because of the severeness of the 1980-1983 recession in the Lawrence area, employment fell over 4.5 percent from 1979 to 1983; some of the growth since 1985 has been simply catching up.

The detailed breakdown of the Lawrence area forecast is presented in Table 4. The anticipated decline in mining and construction employment reflects both a general decline in Kansas mining and a continuation of the moderate level of construction that took place in 1989. The forecasted increase in manufacturing employment is a result of the expected increase in Kansas durable goods manufacturing; transportation, communication, and public utilities employment are not envisioned to change in 1990. The modest growth of wholesale and retail trade and service industry employment in 1990 is a response to the reduction in growth of the rest of the Lawrence area economy in 1989 and the anticipated continuation of that trend in 1990. The increase in F.I.R.E. employment is due to the expected nearly full percent point drop in interest rates in 1990, particularly Moody's AAA corporate bond rate.

Figure 4
Lawrence Area Nonfarm Wage and Salary Employment Growth



Topeka Area Forecast

The Topeka area is projected in 1990 to be the slowest growing subregion in northeast Kansas. The forecasted growth rate of 0.7 percent for Topeka area employment is below both the forecasted U.S. growth rate of 2.0 percent and the Kansas growth rate of 1.3 percent. Figure 5 illustrates the moderate growth that the Topeka area has experienced since 1986. From 1985 to 1989 the subregion grew 9.8 percent while the U.S. grew 11.2 percent and Kansas grew 8.6 percent, indicating that the Topeka area's expected weak growth rate for 1990 is not part of a historical trend but a deviation from the trend.

The detailed breakdown of the Topeka area forecast can be found in Table 5. The projected decline in mining and construction employment of -2.5 percent, in manufacturing employment of -5.2 percent, and in transportation, communication, and public utilities employment of -4.2 in 1990 is a consequence of the decline in corporate profits which began in 1989 and is expected to continue through the first half of 1990. The projected relatively strong growth in the service industry employment of 3.5 percent is a result of the expected rise in the number of governmental employees. The growth in F.I.R.E. employment of 2.9 percent, like the Lawrence area growth, is due to the expected drop in Moody's AAA corporate bonds. The slow growth in wholesale and retail trade employment of 0.4 percent is an outcome of the slow growth of the rest of the economy.

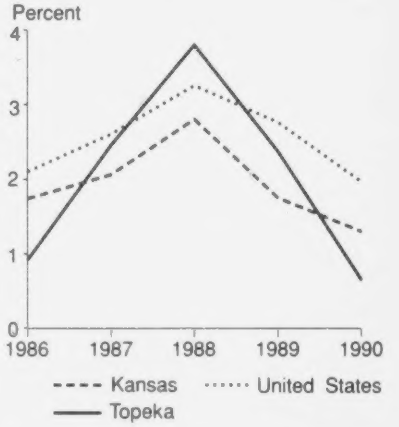
Table 3
Northern Tier Nonfarm Wage and Salary Employment Forecasts (in thousands)

	1988	1989	% Change 1988-89	1990	% Change 1989-90
Total	15.4	15.7	1.9	16.0	1.9
Mining and Construction	0.4	0.4	0.0	0.4	0.0
Manufacturing	3.1	3.1	0.0	3.2	3.2
Transp., Comm., and Pub. Util.	0.9	0.9	0.0	0.9	0.0
Wholesale and Retail Trade	3.9	3.9	0.0	4.0	2.6
FIRE	0.7	0.7	2.7	0.7	0.0
Services	3.1	3.2	3.2	3.3	3.1
Government	3.3	3.5	6.1	3.5	0.0

Table 4
Lawrence Area Nonfarm Wage and Salary Employment Forecasts (in thousands)

	1988	1989	% Change 1988-89	1990	% Change 1989-90
Total	40.1	41.0	2.2	41.8	2.0
Mining and Construction	1.7	1.7	0.0	1.6	-5.9
Manufacturing	6.0	6.0	0.0	6.2	3.3
Transp., Comm., and Pub. Util.	1.3	1.3	0.0	1.3	0.0
Wholesale and Retail Trade	9.6	10.0	4.2	10.1	1.0
FIRE	1.7	1.7	0.0	1.8	5.9
Services	7.2	7.5	4.2	7.7	2.7
Government	12.6	12.8	1.6	13.1	2.3

Figure 5
Topeka Area Nonfarm Wage and Salary Employment Growth



Conclusion

Because of its size and rapid growth, the KCK area has overshadowed the other subregions in northeast Kansas for at least two decades. In 1989, the area represented about two thirds of the region's total employment while in 1970 it represented only slightly more than half; in contrast, the Northern Tier area constituted about 5 percent of the region's total employment in 1970, while by 1989 it constituted only slightly more than 3 percent. The metropolitan regions, therefore, have increased their proportion of total employment in the region.

As a result of the growth of the KCK area in particular, and of the metropolitan areas in general, northeast Kansas is becoming more of a service center. Two examples illustrate this phenomenon: first, since 1970, employment in the northeast Kansas F.I.R.E. sector has increased more than 200 percent, while employment in the same sector for the rest of Kansas has increased about 30 percent; as a consequence, the proportion of statewide F.I.R.E. sector employment located in northeast Kansas has increased from 36 percent in 1970 to an estimated 58 percent in 1990. The second example pertains to the business services sector: Johnson County employment in business services increased 287 percent during the 1978-1987 period, compared to only 72 percent[4] in the rest of the state. A possible repercussion of this growth in service-oriented business is increased commercial property taxes due to the changes in the Kansas property tax laws currently being implemented.

Another repercussion of the growth of the KCK area is the increased sensitivity of the northeast Kansas economy to changes in the national economy. National variables play a major role in the econometric model of this subregion, much more so than in the other areas. Historically, the KCK area has grown at a faster rate than the U.S. growth rate; when the national economy slows down, however, the KCK area responds quickly to the change. As a consequence, if the national economy were to fall into a recession, the KCK area and the northeast Kansas economy should expect much slower growth than predicted in the present forecast.

Table 5
Topeka Area Nonfarm Wage and Salary Employment Forecasts (in thousands)

	1988	1989	% Change 1988-89	1990	% Change 1989-90
Total	97.1	99.4	2.4	100.1	0.7
Mining and Construction	3.9	4.0	2.6	3.9	-2.5
Manufacturing	9.7	9.7	0.0	9.2	-5.2
Transp., Comm., and Pub. Util.	7.1	7.1	0.0	6.8	-4.2
Wholesale and Retail Trade	23.2	23.7	2.2	23.8	0.4
FIRE	6.8	7.0	2.9	7.2	2.9
Services	22.2	22.8	2.7	23.6	3.5
Government	24.2	25.1	3.7	25.6	2.0

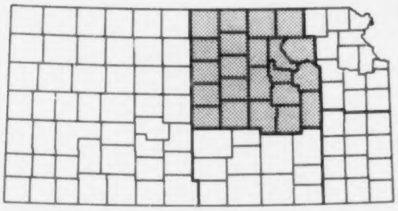
Notes

1. Throughout the rest of the text of this paper the term employment will refer to nonfarm wage and salary employment, which is employment by place of work rather than employment by place of residence. This definition of employment counts the number of jobs in a county, not the number of employed persons in a county. For a further explanation of this definition, and why it was chosen as economic phenomenon to forecast, see the next section.

2. For more detail about the creation of the subregional models, see Robert Glass, "Northeast Kansas: Diversity and Development," *Kansas Business Review* 12, no. 2 (Winter 1988-89), 13-18.

3. The two most important categories of employment which are excluded from nonfarm wage and salary employment are farm employees and self-employed persons.

4. The figures are from *County Business Patterns 1987*, the latest year for which data are available.



North Central Kansas
The Region Follows the State

Robert B. Catlett
Arthur J. Janssen

Robert Catlett and Arthur Janssen are both assistant professors of economics at Emporia State University.

Over the last twenty years, the economy of north central Kansas has closely patterned that of the state. This is particularly true of the major economic indicators: employment and personal income. In addition, the industrial mix within the north central region closely parallels the state's industrial make-up. Because of these similarities, forecasts of regional economic activity can be based on economic forecasts for the state.

Population in north central Kansas began to decline in the early 1980s, whereas the state's population has continued to grow; currently, regional population is roughly the same as it was in the mid-1970s. For most of the counties in the region, the median age is above that of the state; only Geary, Lyon, Riley, and Saline counties were below the median. In every county, per capita income was below the state level, although in the counties of Saline, McPherson, and Lincoln it was only slightly below.

A wide variety of economic indicators are used to assess economic conditions of the national economy; among these indicators, real GNP probably receives the most emphasis nationally. A decline in real GNP that lasts at least two consecutive quarters frequently is used as a crude rule of thumb to indicate a recession. Although county data that are identical to the national real GNP data are not available, real personal income serves as a reasonably close substitute.

Examination of real personal income in north central Kansas reveals a general trend of growth interrupted occasionally by a decline or unusually slow growth. Over the past two decades, the national economy experienced recessions in 1970, 1974-75, and 1980-81. Figure 1 illustrates the levels of real personal income in Kansas and the north central region of the state. The logarithmic scale on each vertical axis makes it easier to compare growth rates at different points in time for a variable since the same vertical distance represents the same percentage change; e.g., the distance from 10 to 20 would be the same as any other 100 percent increase such as the distance from 1000 to 2000.

At the risk of stating the obvious, all of the 22 counties do not necessarily exhibit the same trends as the region, just as in the national economy some states experience rather severe recessions as other states have unusually rapid growth; further, not all industries expand, let alone at the same pace as the regional economy (Figure 2). Nowhere is this more evident than in agriculture, which now directly accounts for approximately 6 percent of the region's personal income and less than 10 percent of its total employment (Figure 3).

Figure 1
North Central Kansas Real Personal Income (millions of 1982 dollars)

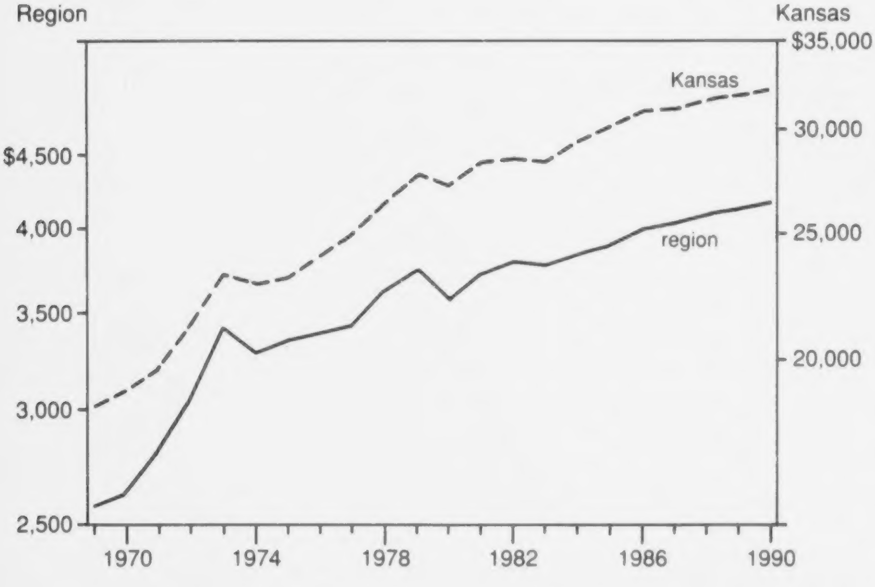


Figure 2
North Central Kansas Employment

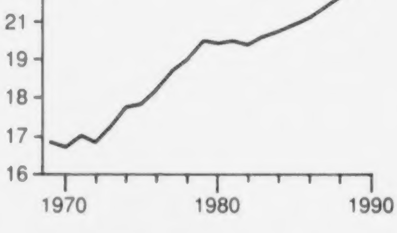


Figure 3
North Central Kansas Farm Employment

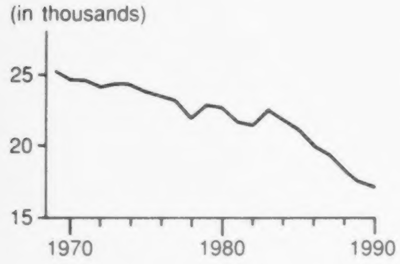


Figure 4
North Central Kansas Government Employment

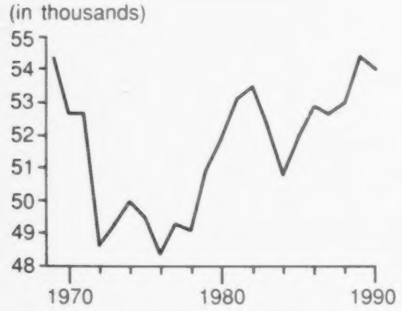
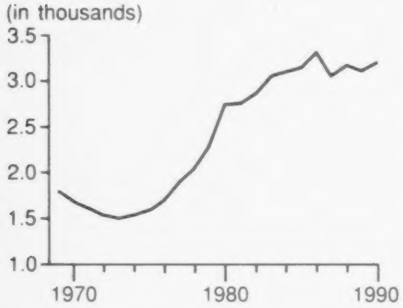


Figure 5
North Central Kansas Mining Employment



A glance at Figure 4 shows that government employment is not as stable as one might suspect. This trend is potentially important since government employment levels are higher than any other sector in the region. The military is included in this data, so that changes at the military base in Riley County account for part of the fluctuations illustrated. The annual data illustrated eliminate any seasonal effects that might occur. There was considerable change in the number of employees working for the state of Kansas and local governments in the decade of the seventies.

Mining in the region continues to be a relatively small source of employment: mining includes workers in oil and gas extraction industries. The dramatic increases in the prices of these resources led to increased activity and employment after the Arab oil embargo that began in late 1973. As prices tumbled in the middle of the 1980s, so did employment in the region, though not by as much as in the well-known energy-producing areas (Figure 5).

Employment in wholesale and retail trade increased dramatically in the early 1970s. While retail trade employment levels tend to fluctuate, wholesale trade employment in recent years is more stable, yet declining. Recession years, except 1970, tend to be associated with the downswings in retail employment (Figures 6 & 7).

Transportation and utilities industries have firms that range from large to small. Some changes are due to large national firms, such as railroads, moving their employees; deregulation of trucking may also have some impact. Though one might suspect employment in public utilities to be exceedingly stable, it should be pointed out that large additions to a coal-fired electrical generating facility were completed within the region (Figure 8).

The service sector of the economy has had stable sustained growth that is matched only by a similar broad industry classification of finance, insurance, and real estate. These trends are similar to the national economy (Figures 9 & 10).

Manufacturing employment showed the most dramatic growth in the region by approximately doubling during the decade of the seventies; this growth halted at approximately the same time as the last recession. While it appears as

Figure 6
North Central Kansas Retail Trade Employment

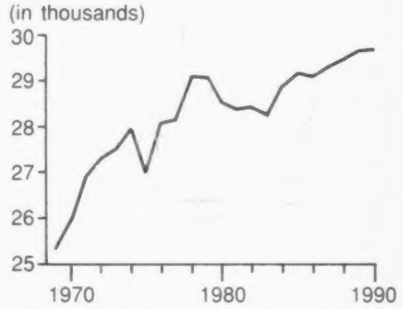


Figure 7
North Central Kansas Wholesale Trade Employment

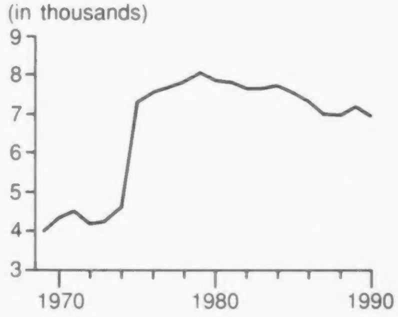


Figure 8
North Central Kansas Transportation and Utilities Employment

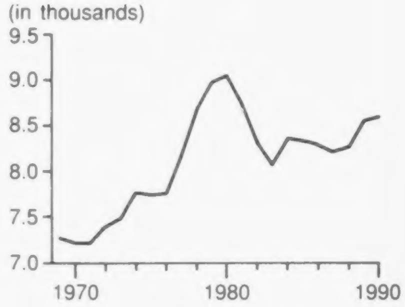


Figure 9
North Central Kansas Services Employment

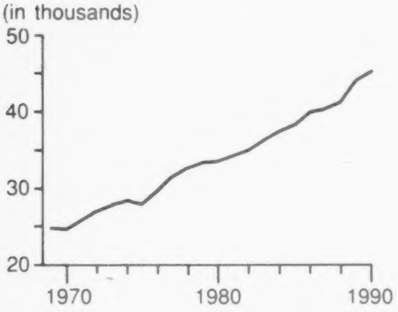


Figure 10
North Central Kansas Finance Insurance & Real Estate Employment

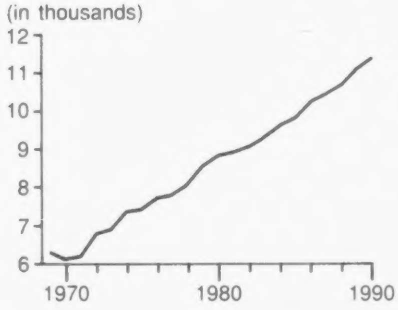
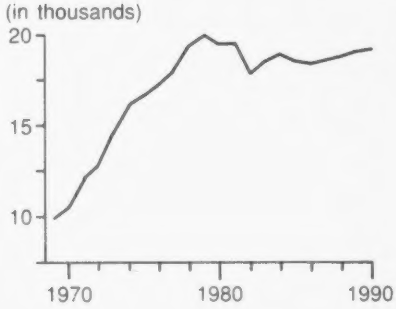


Figure 11
North Central Kansas Manufacturing Employment



though manufacturing never recovered from the last recession, it might be helpful to recognize that the national trend has relatively stable employment levels (Figure 11).

Generally, the region has experienced somewhat slower growth than the state has in recent years in terms of income and employment; the same holds true in comparing each sector for the region to that of the state. In construction, transportation, services, finance, wholesale and retail trade, and government, the region has grown at a slower rate than the state.

Outlook

Table 1 shows projected employment growth rate by sector. Government employment is expected to experience a 1.0 percent decline in 1990; higher growth rates are expected for the service sector, finance, construction, and mining. Manufacturing, which had been the most rapidly growing sector, is only expected to grow by 0.7 percent in 1990; transportation and wholesale trade are expected to experience a decline in employment in 1990. Retail trade will grow at just under 1.0 percent; at -2.0 percent farm employment will decline at half its 1989 rate.

Table 1
North Central Kansas Employment Forecasts (in thousands)

	1989	% Change	1990	% Change
Employment	210.6	2.2	212.3	0.7
Services	43.9	6.7	45.2	2.8
Manufacturing	19.0	1.6	19.2	0.7
FIRE	11.1	3.9	11.4	2.7
Construction	9.9	-1.1	10.1	2.1
Transportation & utilities	8.5	3.5	8.6	0.5
Wholesale trade	7.2	3.3	6.9	-3.5
Retail trade	29.6	0.7	29.7	0.8
Mining	3.1	-1.8	3.2	3.0
Government	54.4	2.6	54.0	-1.0
Farm	17.4	-4.1	17.1	-2.0

Forecasts for employment and income in the north central region are based on the projections of the Kansas Econometric Model. The Model forecasts slow growth for the state, which suggests slow growth for the region. Employment in the region is expected to grow at a rate of 0.7 percent compared to 0.5 percent for the state. Real Personal Income is forecast to grow at a rate of 1.0 percent for the region, compared to 1.2 percent for the state. In each case, these growth rates are below the historical trends. The forecasts were derived from the following first order autoregressive models:

1. Regional employment =
   79265.487 + .0888779 x state employment
   (14.6) (19.9)

   $\rho = .3524$ $R^2 = .986$
   (1.27) 1969-1986

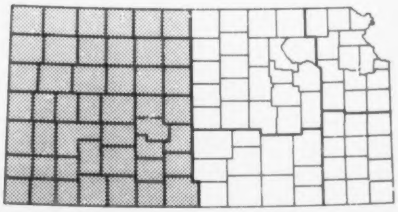
2. Real income =
   90082.27 + .1018518 x (real Kansas income)
   (3.08) (9.419)

   $\rho = .5735$ $R^2 = .973$
   (3.16) 1969-1986

Note

Income and employment data from 1969 to 1986 are from the U.S. Department of Commerce, Bureau of Economic Analysis. Income data were deflated using the personal consumption deflator (1982 = 100). The percent data are derived from the Kansas Econometric Model.

Western Kansas Agriculture: The Sustaining Force



Ralph Gamble

Dr. Gamble is a professor of economics and finance at Fort Hays State University.

All of the forecasts in this section were prepared by students of Dr. Gamble's Graduate Business Forecasting class. Most of the forecasts were produced by quadratic trend models, with the residuals estimated as ARIMA processes. Monthly forecasts and actual values were then transformed into yearly values by forming 12-month centered moving average. The data were provided by Wharton Economic Forecasting Associates. The expectations that follow are based on the consensus forecast that the U.S. economy will grow slowly in 1990, but avoid recession.

Population

Since 1983, the population of western Kansas has been declining, and, with it, the employment opportunities of the region, although there is some evidence that the population decline may be ending or slowing soon. Employment and population declines in northwest Kansas may have run their course, and the increases in parts of southwest Kansas show little sign of abatement.

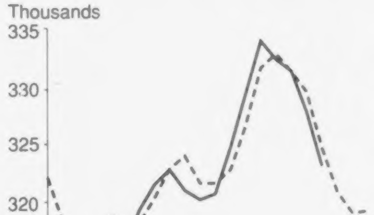
The population of southwest Kansas increased by 4 percent from 1977 to 1987. Growth counties with large populations (Finney, Ford, and Seward) increased by 14,000 or 22 percent; surrounding counties' populations (Kearney, Gray, Grant, Haskell, and Stevens) increased by 1,100 or 4.5 percent. Counties with stationary populations were Barton, Greeley, Scott, Stanton, Morton, and Pratt. The remaining fourteen counties had combined decreases of 8,300 or 13.7 percent.

In the same period, the population of northwest Kansas decreased by 6 percent. Only two counties had population increases: Ellis county, which gained 1,350 or 5 percent, and Thomas county, which gained 1,000 or 14 percent. Population in the remaining 16 counties decreased 9,750 or 11 percent.

In western Kansas, therefore, growth in five counties lessened but did not reverse the loss of jobs and population in smaller and more rural counties in the last decade: to an extent which is unknown the growth in the five counties came at the expense of neighboring counties. Since most of the growth that did occur was located in southwest Kansas, the center of economic gravity in western Kansas has shifted to the south.

These trends are largely masked by aggregation of data from county to regional level, although the overall population trend in western Kansas remains evident (Figure 1). Population peaked in 1983 and has declined since then; however, if the loss of population in smaller counties slows, while population gain in the five growing counties continues, then a forecast of stabilizing population for western Kansas in 1990 may be valid. Our view is that population will stabilize at approximately 320,000 persons in 1990, and resume slow but positive growth thereafter.

Figure 1
Western Kansas Population



Employment

Private employment in western Kansas follows a pattern similar to that of population, peaking in 1984 (one year after the population peak) at approximately 97,000 jobs (Figure 2). From 1984 to 1987, the total reduction of private jobs was approximately 9,500 or 10 percent, while the population loss was approximately 9,200. Our forecast calls for total private employment to remain essentially flat in 1990, increasing only by 170 jobs.

The economy of western Kansas seems to have been most affected in the past by two out of the ten series that compose total private employment: mining and manufacturing employment.

Figure 2
Western Kansas Total Private Employment

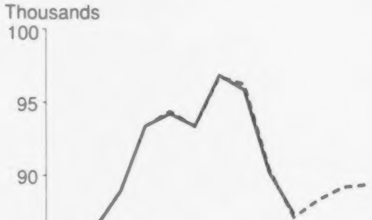
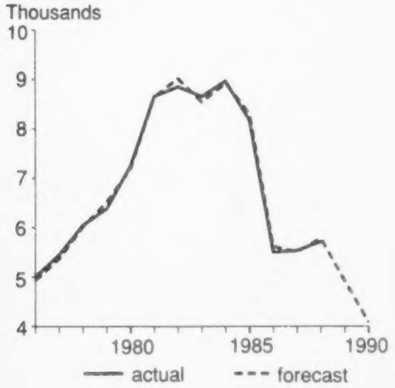
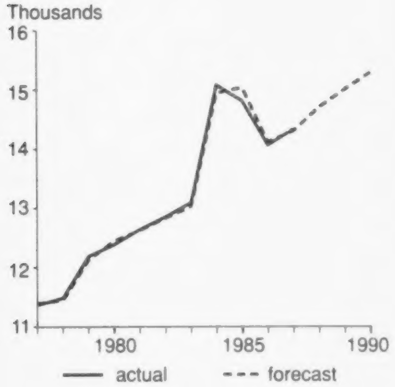


Figure 3
Western Kansas Mining Employment



This effect can be seen by comparing the growth of the two series with that of total private employment; for example, the increase in mining employment (Figure 3) from 1976 to 1981 added, by itself, about 4,000 jobs, as higher energy prices stimulated increased leasing, exploration and maintenance of oil and, later, gas wells. By 1984, the energy boom had largely evaporated, and mining employment gave up in the next two years all the increase of the past decade, as unprofitable wells were shut-in, and drilling activity stopped. Given stable oil prices, drilling should not increase rapidly, but neither should abandonment. Given natural gas decontrol, and market-oriented wellhead prices, natural gas exploration and servicing can be expected to increase mining employment--witness, for instance, the Hugoton field--but only slightly, since low-output gas-well servicing requires less labor than low-output oil wells. We do not believe energy prices are due for an increase, barring supply disruptions; in fact, prices should fall during early 1990 as slower-growing industrial nations (including the U.S.) use less energy. Hence our forecast of stable to slightly rising mining employment in western Kansas.

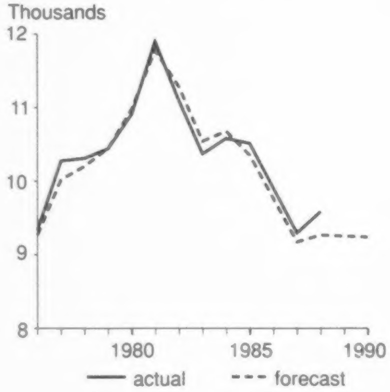
Figure 4
Western Kansas Manufacturing Employment



The second sector that affects population and total private employment is manufacturing employment (Figure 4). In the decade ending in 1987, manufacturing employment grew at 2.3 percent compound rate, adding about 3,000 jobs in western Kansas. This occurred despite two recessions which do not seem to have reduced manufacturing employment in the region. There was a pronounced increase in 1984 during which 2,000 jobs were added - 1,675 above trend; these were just as rapidly eliminated in 1986. The increase may have been due to the end of the Reagan recession, and the decrease to the near-recession of 1985, it may have been the result of the growth and then loss in oil-related work, or it may have resulted from exchange-rate fluctuations. The dollar's value peaked at 271.61 yen in October, 1982, then declined 15 percent by October, 1983, and increased 6 percent from January, 1984 to January, 1985. Three things stand out: first, manufacturing employment in western Kansas seems to be fairly immune to mild recessions; second, it seems to have reverted to its long-term trend in 1987; third, along with mining, it seems to drive, or at least lead the economy of the region. We expect slow but fairly stable growth at 2.3 percent per year to be continued, with manufacturing employment in 1990 to be about 15,300.

Wholesale trade employment followed a similar path, first increasing, peaking in 1981 at 11,900 jobs, then decreasing to a low in 1987 of 9,290 jobs (Figure 5). The loss in jobs totaled 2,610, or 22 percent. In 1988, this sector added some 300 jobs, but increasing centralization and efficiencies are not likely to result in more jobs. Our forecast is for employment stability in this sector.

Figure 5
Western Kansas Wholesale Trade Employment



Two employment sectors bear similarity to each other and to total private employment, although they lag mining, wholesale trade and manufacturing employment: they are retail trade and transport, utility, and sanitation employment (Figures 6 and 7). Retail trade employment peaked in 1985, when 23,270 persons were employed; since both mining and manufacturing employment peaked earlier, in 1984, it is likely

Figure 6
Western Kansas Retail Trade Employment

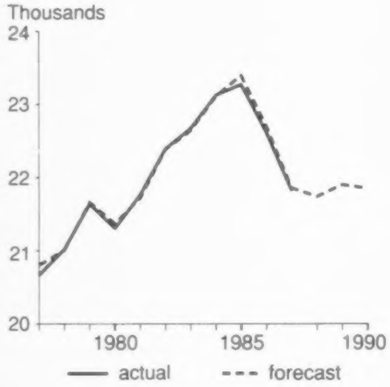
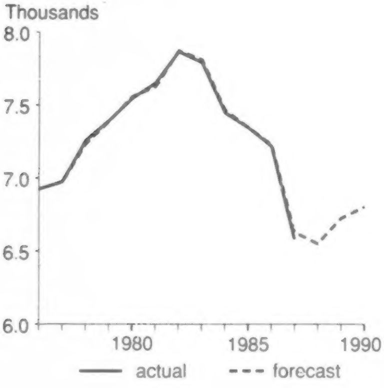
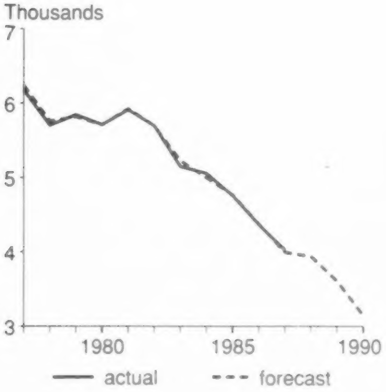


Figure 7
Western Kansas Transportation, Utilities and Sanitation Employment



that retail trade employment is caused, or driven, by mining and manufacturing employment. This is plausibly a demonstration of the employment multiplier effect, wherein an exogenous employment shock to a region generates a total employment change that is a multiple of the initial shock, as one person's extra spending becomes another person's extra income, and so on. The series is largely determined by the retail centers of western Kansas--Ellis, Barton, Finney, and Ford counties. There has been a tendency for concatenation of smaller retailing into larger towns of the region, for reasons of efficiency, variety, and falling transportation costs. We suspect that these changes are largely complete; however, little additional growth can be expected from this sector, being derived from spending, which is likely to be flat for the region as well as the nation. Our forecast calls for retail trade employment to stabilize in 1990 at approximately 22,000 persons.

Figure 8
Western Kansas Construction Employment

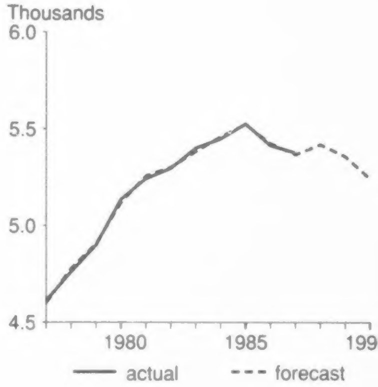


Transportation, utilities, and sanitation employment appears to lag population; this sector also seems to be subject to increases in efficiency. The series peaked in 1982, with 7,870 jobs; by 1987, employment had declined to 6,580, for a job loss of 1,290 or 16 percent. We expect employment in this sector to remain small--perhaps increasing slightly for a time--as new technologies such as fiber cable installation require temporary additions in employment.

The most dismal of all sectors is construction employment, which fell in 1978, stabilized until 1980, then fell steadily through 1987 (Figure 8). Although not a large sector in terms of numbers, the steepness and persistence of loss is especially noticeable. From 1977 to 1987, 2,150 construction jobs were lost; the series declined by 35 percent. We expect that the era of large percentage declines is over; however, with large numbers of homes and apartments for sale, we expect no immediate increase in residential construction. Even if manufacturing recaptures its long-term trend, nonresidential construction may provide little if any increase in employment, since construction employment fell unabated during the persistent rise in manufacturing employment of 1978 to 1984; thus our forecast of continued contraction of construction employment.

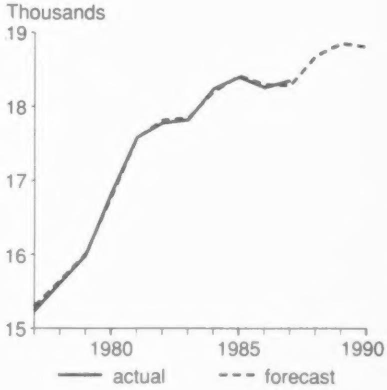
There are two final sectors in private employment that provide a breath of optimism in an otherwise pessimistic employment picture: they are finance, insurance and real estate (FIRE) employment, and service employment (Figures 9 and 10). FIRE employment did not peak until 1985, at 5,525 jobs, and hardly declined thereafter, falling to 5,375 in 1987. From 1977 to 1985, growth in FIRE jobs totalled 913, for a compound growth rate of 2.3 percent per year. We suspect that consolidation in banking, brokerage and real estate has occurred but has been largely offset by overall growth in insurance-related jobs. We expect those trends to continue. FIRE employment should decrease only slightly in 1990.

Figure 9
Western Kansas Finance, Insurance and Real Estate Employment



Service employment in western Kansas, as in the state and nation, has been the star performer in the recent decade (Figure 10). The growth rate in service employment is about the same as in FIRE employment, but the service

Figure 10
Western Kansas Service Employment

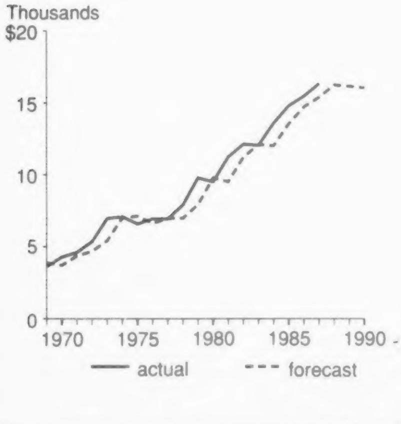


sector is nearly four times the size of the FIRE sector, and accounts for over 20 percent of total private employment. Service employment grew until 1985, peaking at 18,400 jobs; it fell slightly in 1986, and made up the loss in 1987. From 1977 to 1985, 3,170 jobs were added in services; the compound growth rate was 2.4 percent per year. The service employment series shows clearly that even though mining and manufacturing employment were decreasing, and people were emigrating from the region, service sector employment kept right on increasing. As median age, income and wealth of the remaining population in the region increase, we expect demand for medical, legal, professional and other services to increase. The growth in service employment should continue, growing to approximately 18,800 in 1990.

Income

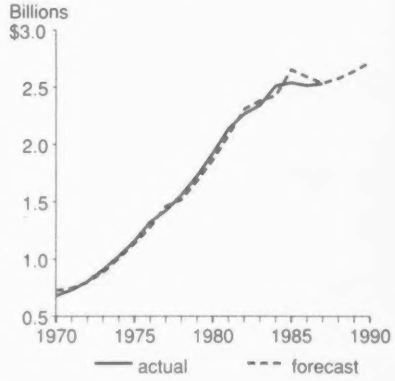
Per capita income (PCP) has not been adversely affected by the loss of population and employment (Figure 11). PCP has increased overall at an 8.75 percent annual compound rate since 1969. Since 1980, the growth rate has slowed to 8 percent; prior to 1980, the rate was 9.7 percent, although the average inflation rate was higher in the former period. Years of recession clearly diminished the growth in PCP, but population and employment losses do not seem to have affected it--probably another indication of the increasing average age of the remaining population, or the departure of younger and thus lower-income residents. This is also evident in the county data. Some of the most rapid increases in PCP occurred in smaller, more farm-oriented counties, which also recently lost population; for example, Hamilton county, in the western tier, lost population, but its PCP increased to $23,000. The impacts of economic recoveries are also apparent in the data, although they have become muted over time: the 1972-73 expansion increased PCP by 30 percent, the 1978-79 expansion by 24 percent, but the 1983-84 expansion increased PCP by only 13 percent. It seems that PCP is most in tune with the national economy, rather than the regional economy; it is also affected by fluctuations in the farm economy. With slow growth and reduced inflation expected in the national economy for 1990, our expectation is that PCP will fail to increase in 1990, remaining at approximately $16,100 per person.

Figure 11
Western Kansas Per Capita Personal Income



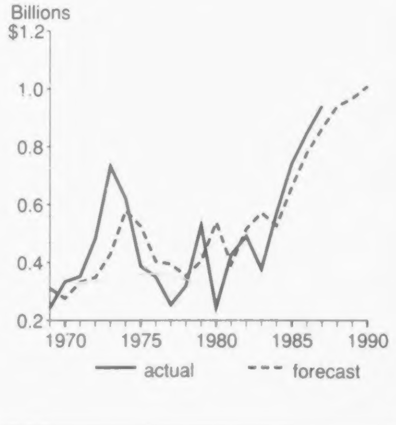
In 1987, nonfarm personal income in western Kansas (NFWK) was $2.532 billion (Figure 12); in 1985, NFWK was $2.541 billion. This lack of growth is unique in the past two decades. Since 1970, through three recessions, NFWK has decreased for only one year: from 1985 to 1986. This more than any other series illustrates the great contraction in the economy of western Kansas during 1985-86. During the period 1970 to 1985, NFWK grew at an annual compound rate of 9.2 percent; after the contraction of 1986, the growth rate was once again positive during 1987, but only two-thirds of its former rate, at 6.2 percent annually. If this growth rate continues, then NFWK will be $3 billion in 1990; if this growth rate is halved, NFWK will be $2.7 billion. Our expectation is that NFWK will not return to its previous trend until later in the 1990s, since inflation and the oil boom were responsible for much of its growth. We therefore expect NFWK to be approximately $2.72 billion in 1990.

Figure 12
Western Kansas Nonfarm Personal Income



The most variable of all the time series, as one might expect in western Kansas, is farm personal income (Figure 13). The series peaked in 1973, and it was not until 1985 that the previous high ($733 million) was topped. In 1987, farm personal income was $940 million and equal in purchasing power to $367 million in 1973, which indicates that the 1973 value has yet to be bettered, in real terms. It will, eventually, unless periodic food shortages, for the first time in at least 3,000 years, are now to be eliminated. Farm income depends in large measure on unpredictable factors, such as growing conditions, crop disease and pest infestations in the region and in the rest of the world, and policies of importing and export-competing countries, among others. No prediction of next year's weather will be attempted. There are, however, several factors which lead

Figure 13
Western Kansas Farm Personal Income



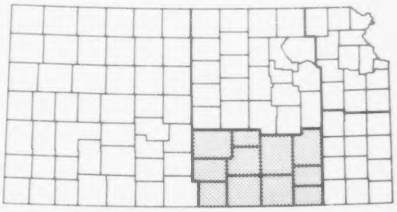
to optimism with regard to farm personal income in 1990: world carryover stocks are low; emerging Eastern European countries, including the USSR are likely to desire increased credits and increased imports of foodstuffs, and receive both; rainfall in October has given parts of western Kansas a good start on the 1990 crop year; farm programs are unlikely to be dramatically different. We therefore expect further increases in the one-fourth of western Kansas income that farm personal income represents, to be slightly over $1 billion in 1990.

There is another aspect of the western Kansas farm impact that should be considered: that of the grasslands, or Conservation Reserve Programs (CRP). Up to 25 percent of cropland under three years' consecutive ownership is eligible for participation. In some southwestern counties, that amount has been signed up; in the state, over 2.5 million acres have been accepted in the first eight plans, and another 358 thousand acres have been submitted in the last sign-up. If all are accepted in the final plan, the total will be nearly 3 million acres of cropland removed from production in Kansas, of which more than half is in western Kansas. After grass growth is established, the requirements for inputs are virtually zero: only mowing every two years or so is required. The impact of these programs will then be to decrease input purchases. For the first year or two, since cost is shared on a fifty-fifty basis, input use may actually increase; but thereafter, input usage will decrease for the remaining portion of the ten year programs. If we suppose that $100 of inputs per acre are to be made unnecessary for 1.7 million acres of western Kansas cropland, the primary impact may be estimated to be $170 million per year. This will be at least doubled through multiplier effects. The total effect may then be a reduction in non-farm income of up to $340 million per year. This will be somewhat offset by the increase in net farm income that the programs provide.

Conclusion

Warnings of the imminent demise of western Kansas, like predictions of global warming (or dishes of poisonous applesauce) need to be served with plenty of skepticism. We believe that the economic experience of the past fifteen years is best explained as a specific example of generic boom and bust cycles that always and inevitably accompany extractive industries. The gold, silver, copper and uranium booms of western states are familiar parts of their histories; now comes the oil boom which, being most recent, is most likely to be considered in isolation, removed from historical antecedents. But economic life in western Kansas has only recently been driven by extractive industries: since settlement, agriculture has been the sustaining force of the region, despite its fluctuations, and it still is. In the recent past, manufacturing and service employment have contributed much to the region.

We can, if we wish, consider the economic losses of the recent past to be the beginnings of a new and ominous trend that will continue until nothing remains in western Kansas except buffalo grass and romantic writers. Or we can consider the end of the petroleum boom as a return to normalcy. It is our opinion--and our prayer--that the latter is correct.



South Central Kansas 1990 Economic Forecast

David J. Poynter

David J. Poynter is director of the Center for Economic Development and Business Research, W. Frank Barton School of Business at The Wichita State University.

The 1989 national economy has followed a "soft-landing scenario," during the first quarter of 1989, of a restrictive Federal Reserve Bank monetary policy to slow the economy and control increasing rates of inflation. The result has been rising interest rates which peaked midyear and have since declined.

The consequence of the "soft-landing scenario" has resulted in slower activity in the manufacturing sector. Industry utilization rates, currently at historically high levels of 84 percent of existing capacity, have leveled off and declined slightly after substantial increases in 1987 and 1988. The growth rate of national manufacturing employment has stabilized and declined slightly during the second and third quarter of 1989. Aerospace employment reported a slight decline in 1988 and is projected to decline again in 1989.

Reflecting the slowdown of the manufacturing sector, producer prices for finished goods have moderated to 4 percent in recent months after achieving annual growth rates of over 8 percent in 1988. Other prices, such as the Consumer Price Index, (CPI) have moderated or declined in July, August, and September; however, excluding food and energy, the annual growth rate of the

CPI is around 4 percent for most of 1989.

Despite the slowdown of the national manufacturing sector, the Wichita area's current and projected growth looks very promising. The driving component of the Wichita area economy is manufacturing employment, currently growing at an annual rate of 3.7 percent as of August 1989.

Future growth will be affected by the following events and announcements:

1. Cessna Aircraft Company has announced two new business jets, which expand its current product line with an entry-level $2.4 million Citation Jet and a top-of-the-line $8.8 million Citation IV. Cessna is expected to hire an additional 1,500 employees over the next year and a half.

2. A Wichita division of an Italian aircraft manufacturer, Rinaldo Piaggio Co., which currently builds the fuselage of its turboprop general aviation aircraft, is expanding employment by 200 workers. Piaggio also plans to announce the location of a final assembly plant in the next 6 months which could result in an additional 200 to 250 jobs.

3. Beech Aircraft has new aircraft stemming from the King Air and Commuter product lines; other new aircraft include the Beechjet and the Starship. Beech plans to add an additional 500 jobs.

4. Boeing Company announced a corporate restructuring which will become effective Jan. 2, 1990. The reorganization of the Wichita based Boeing Military Aircraft Company will be split into commercial and military divisions. The change is expected to help Boeing respond to the changing composition production from military to commercial aircraft. The Wichita plant currently builds 75 percent of the 737 airframe and contributes to other Boeing commercial aircraft subassemblies.

5. The United States Air Force is expected to award a $1.5 billion contract early in 1990. The contract is for a Tanker Transport Training System (TTTS) which includes the acquisition of almost 200 general aviation aircraft, training systems, and support. Currently all of the finalists are Wichita general aviation companies. Depending on the company which wins the fly-off, the TTTS contract could generate an additional 500 to 1000 jobs.

Table 1
Effective Wichita MSA Manufacturing Employment by Place of Resident County for South Central Kansas

County	County as a Percent of Wichita MSA Manufacturing Employment	Level of Effective Employment
Butler	8.05%	5,397
Chautauqua	0.00	3
Cowley	1.90	1,273
Elk	0.17	116
Greenwood	0.22	145
Harper	0.15	98
Harvey	1.36	908
Kingman	0.42	281
Reno	0.26	176
Sedgwick	80.52	53,948
Sumner	6.57	4,399
Other Kansas Counties	0.38	257
Wichita MSA Mfg. Employment		67,000

Source: Center for Economic Development and Business Research in the Frank Barton School of Business, Wichita State University.

These prospects directly affect the current and near term growth of the south central Kansas economy. Challenges include a manufacturing sector labor force which is adjusting from military contracts to general aviation and commercial aerospace production.

Local labor markets will have difficulty expanding quickly to meet the need for projected skilled labor without recruiting outside the region; however, with a slowing national manufacturing and aerospace sector, the potential for immigration into the local economy has a good chance of succeeding. The balance of the labor demand will be made up of part-time and/or under-employed workers, and individuals who will reenter the labor market as the hourly wages increase. Currently the unemployment rate for the Wichita MSA is 4.4 percent of the civilian labor force as of August 1989.

The growth of Wichita MSA manufacturing employment will not only impact Sedgwick county but will affect other south central Kansas communities as well, because many individuals currently commute to Wichita from surrounding counties. By using internal Center for Economic Development and Business Research (CEDBR) data regarding the residence of Wichita employees, the level of effective manufacturing jobs for south central Kansas counties can be estimated given a projected level of 67,000 jobs. Table 1 shows the level of effective employment by residence for south central Kansas.

The CEDBR closely monitors Wichita MSA manufacturing employment and has discovered a consistent relationship with local area real retail sales. Since the late 1970s our analysis reveals that manufacturing leads real growth by about six months over an average economic cycle. The real retail sales information is treated as a good aggregate indicator for the Wichita area economy. Last year we predicted that real retail sales would grow around 0.5 percent in 1989, given a manufacturing employment growth of 0.5 to 1 percent; however, manufacturing is currently growing at an annual rate of 3.7 percent in August 1989. Since we missed the mark on projecting employment growth, real retail sales should be significantly stronger than forecast; the annual growth rate of real retail sales for

Sedgwick county as of June 1989 was at 1.1 percent.

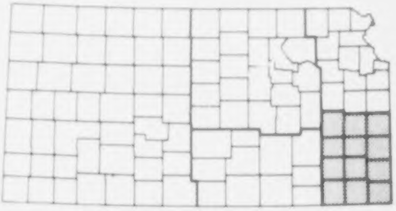
The past labor dispute between Boeing and the International Association of Machinists and Aerospace Workers will dampen the overall growth of the Wichita economy between 0.1 and 0.3 percent in 1989. The outcome will be 1989 growth of real retail sales of 1.4 to 0.7 percent.

In 1990 the CEDBR expects real retail sales to continue to grow at around 1.0 percent, given a respective manufacturing employment growth of 2 to 2.5 percent.

As of June 1989 the growth of real retail sales for south Central Kansas counties is Butler (-1.5 percent), Chautauqua (-11.5 percent), Cowley (-3.7 percent), Elk (-3.4 percent), Greenwood (-3.1 percent), Harper (+6.4 percent), Harvey (-5.2 percent), Kingman (-3.6 percent), Reno (-0.5 percent), Sedgwick (+1.1 percent), and Sumner (-0.7 percent). Real retail sales reported for Kansas declined one percent during the same period.

In conclusion, the CEDBR expects south central Kansas and the Wichita area economy to grow in real terms around 1.0 percent. Although most of the manufacturing jobs will be located in the Wichita MSA the impact of the growth will affect all of south central Kansas.

Southeast Kansas Encouraging Prospects for 1990



Richard K. Hay

Dr. Hay is executive director of the Institute for Economic Development, Pittsburg State University, Pittsburg, Kansas.

Before the recession of 1982, many people believed that southeast Kansas was relatively recession-proof and that its economy would not follow national trends; unfortunately, along with other Kansans, people from the southeast had a significant awakening in 1982 when they discovered their vulnerability to national forces: not only did the economy of southeast Kansas suffer from the recession, but in the following years it failed to rebound along with the nation. An economic turnaround began in 1987 and has continued through 1989; nevertheless, this turnaround represents only a modest beginning.

Although southeast Kansas shares many economic characteristics with the entire state, it also has some unique attributes. Historically, the region has depended upon the declining industries of mining and railroads; the shakeout in these industries has continued through 1989, particularly in Parsons and Pittsburg. The region has attracted footloose, low-technology, labor-intensive industries, which have picked up some of the slack from the declining major industries. Recently, existing industry expansion and new venture startups have been emphasized.

In addition, the southeast Kansas economy has suffered from a lack of regional infrastructure development, for although community infrastructure is generally quite good, the region has not been successful in developing adequate transportation networks, especially four-lane highways.

Employment

During 1989, total employment was relatively stable throughout the region. Employment increased in seven of the 12 counties but only in Labette County was there a substantial employment shift. Labette County employment primarily reflected layoffs due to major cutbacks in the KATY Railroad and in the Kansas Army Ammunition Plant. During 1989 the unemployment rate in the region averaged approximately 5.9 percent, but it ranged from a low of 3.6 percent in Woodson County to 8.7 percent in Labette County. Ten of the 12 counties, however, had unemployment rates of less than 6 percent, an almost identical pattern as in 1988. Although employment has stabilized and even grown slightly in recent years, and even though the unemployment rate has reached approximately the level of the early 1980's, it is important to note that during the past decade southeast Kansas has experienced a net loss of approximately 5,000 jobs; thus, a significant economic development and job creation task remains.

Construction

Construction activity has shown some improvement during 1989. For the first nine months of the year the total value of building permits was 4.5 percent above the same period in 1988. Construction in the region has been enhanced particularly by the building of a new jail in Independence and of the new Superior Industries plant in Pittsburg. The improvement in construction, however, has been well distributed through the region but has been more heavily concentrated in commercial rather than in residential construction. Only this fall has there been any growth in new housing starts. Generally, property values throughout the region have not been sufficiently strong to make new housing price-competitive with the existing housing inventory; there is evidence, however, that sufficient deterioration of the housing inventory has occurred to stimulate demand for new housing, and it is anticipated that the region will experience considerable pressure during the 1990s to replenish and expand its housing stock.

Retail Sales

Perhaps one of the most significant differences between the southeast Kansas economy and the national economy has been the activity of the consumer. Nationally, the recovery from the 1982 recession was led by consumer spending; in southeast Kansas, however, retail sales have remained soft, and the consumer has been a follower rather than a leader. This trend continued during 1988, with retail sales increasing approximately 5.5 percent; national chains like Wal-Mart, however, have done well throughout the region. Services and soft goods were strong.

During the first nine months of 1989 the region's total retail sales increased 5.1 percent compared to 1988, suggesting that real retail sales (after adjusting for inflation) were relatively flat. Since real retail sales have declined somewhat during the decade of the 1980's, this recent stability represents an improvement over the trend. Particularly important is a 14.4 percent in new car sales and a 10.4 percent increase in new truck sales, as measured in number of units sold. This represents an important turnaround in what previously has been an extremely weak component of the region's retail sales.

Summary

Encouragingly, 1989 was the third consecutive year of some economic improvement for southeast Kansas, despite a general softening of the national and state economy. Although the region has experienced substantial improvement since the mid-1980s, it has yet to recover fully from the number of jobs that were lost and from the reductions in retail and construction activity that occurred during the recession of the early 1980s. Generally, the trend is in the right direction but the region has a long way to go to be competitive with the urban areas of the state.

What is encouraging is that the region has attracted several new industries during the past year and that the shakeout in several of the declining industrial sectors has apparently come to an end. The region should be poised for significant economic growth during the 1990s if it can obtain the highway and other infrastructure improvements necessary to facilitate such growth.

Kansas Statistical Abstract, 1988-1989

(Including New County Business Patterns Data and County Rankings Tables)

The *Kansas Statistical Abstract, 1988-1989,* contains state, county, and city level data available for Kansas. The topics covered include county rankings; population; vital statistics and health; housing and construction; education; climate; business and manufacturing; employment and earnings; personal income; banking and finance; state and local government finances and employment; courts, crime, and public safety; parks and recreation; communications; transportation; agriculture; and mining and mineral products. The *Abstract* is available in a spiral bound volume or on 5 1/4" PCDOS/MSDOS floppy diskettes. The diskette files are available in Lotus 1-2-3 format.

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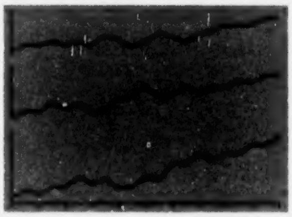


Economic Indicators

Comparison Indicators*

	Quarter or Month	Current Period	Previous Period	Year Ago	% Change From Previous Period	% Change From Year Ago
A. Personal Income - Annual rates, SA						
Kansas - Mil. $	2nd	41503.0	40642.0	39434.0	2.12	5.25
United States - Bil.$	3rd	4457.50	4400.30	4097.53	1.30	8.78
B. Employment						
Kansas - Thou., NSA	3rd	1228.86	1241.85	1217.31	-1.05	0.95
United States - Mil., SA	3rd	117.50	117.29	115.20	0.18	2.00
C. Unemployment Rate						
Kansas - % NSA	3rd	4.1	4.3	4.6		
United States - % SA	3rd	5.2	5.3	5.5		
D. Retail Sales - Annual rates						
Kansas - Mil. $, NSA	3rd	18770.18	17978.50	18273.80	4.40	2.72
United States - Bil. $, SA	3rd	1737.28	1705.82	1627.85	1.84	6.72
E. Consumer Price Index-U, All items, SA						
Kansas City* - 1982-1984 = 100	JAN-JUN	120.60	118.40	116.30	1.86	3.70
United States - 1982-1984 = 100	JAN-JUN	85.92	122.88	119.68	-30.08	-28.21
Kansas Indicators						
F. New Incorporations, NSA						
For Profit - Number	3rd	977	1065	1141	-8.26	-14.37
G. Tax Revenue, NSA						
General Fund Tax Revenue - Mil. $	3rd	485.30	653.79	465.45	-25.77	4.27
H. Operating Expenditures, NSA						
General Fund Operating Expenditures - Mil. $	3rd	393.61	526.91	332.51	-25.30	18.38

* The Kansas City CPI-U is published semi-annually with the first period being January through June average and the second period being July through December average.
National employment and unemployment rate figures are based on the Current Population Survey (household survey).
State figures are based on the Current Employment Statistics Survey (establishment survey).
NSA-Not seasonally adjusted.
SA-seasonally adjusted.

SOURCES: BEA, BLS, Ks. Dept. of Human Resources, Ks. Secretary of State, Ks. Dept. of Administration, Ks. Dept. of Revenue.

National Indicators

					% Change From	
	Quarter or Month	Current Period	Previous Period	Year Ago	Previous Period	Year Ago
General Indicators						
A. Income Measures, Annual rates						
Gross National Product - Bil. 82$	3rd	4160.20	4132.50	4042.70	0.67	2.91
Disposable Personal Income - Bil. 82$	3rd	2920.53	2887.53	2806.43	1.14	4.07
Personal Consumption - Bil. 82$	3rd	2694.10	2653.70	2608.10	1.52	3.30
Gross Private Investment - Bil. 82$	3rd	723.70	719.80	733.60	0.54	-1.35
Net Export of Goods and Services - Bil. 82$	3rd	-63.60	-51.20	-74.90		
Government Purchases - Bil. 82$	3rd	806.00	810.30	775.90	-0.53	3.88
Savings Rate - %	3rd	5.17	5.53	4.27		
B. Labor Force						
Civilian Labor Force - Mil.	SEPT	124.04	124.02	121.98	0.02	1.69
Employed - Mil.	SEPT	117.46	117.60	115.37	-0.12	1.81
Unemployed - Mil.	SEPT	6.58	6.42	6.61	2.54	-0.45
Unemployment Rates - percent						
All	SEPT	5.30	5.20	5.40		
Women	SEPT	6.20	5.40	5.50		
Men	SEPT	5.40	5.00	5.40		
Teens	SEPT	15.10	14.50	15.50		
Blacks and other than white	SEPT	10.10	9.50	9.50		
Whites	SEPT	4.50	4.50	4.70		
C. General Business						
Industrial Production - 1977 = 100	3rd	142.23	141.77	138.37	0.33	2.79
Manufacturing and Trade Sales - Bil. 82$	2nd	1390.50	1382.80	1364.00	0.56	1.94
Manufacturing and Trade Inventories - Bil. 82	2nd	2078.69	2072.35	2019.87	0.31	2.91
New Orders, Durable Goods - Bil. 82$	3rd	316.63	320.56	312.50	-1.23	1.32
Capacity Utilization, Mfg. %	3rd	83.90	84.40	84.00		
New Housing Starts, Private - Thou.	3rd	4017.00	4057.00	4400.00	-0.99	-8.70
D. Prices						
Consumer Prices - 1982-1984 = 100						
CPI-U, All Items	SEPT	124.70	124.50	119.50	0.16	4.35
Food	SEPT	126.20	125.90	120.30	0.24	4.90
Housing	SEPT	123.60	123.50	119.30	0.08	3.60
Apparel	SEPT	118.30	116.30	116.00	1.72	1.98
Transportation	SEPT	113.70	114.30	109.70	-0.52	3.65
Medical	SEPT	152.00	150.80	140.70	0.80	8.03
Producer Prices - 1982-1984 = 100 (NSA)						
All Commodities	SEPT	112.30	112.00	108.10	0.27	3.89
Industrial Commodities	SEPT	111.90	111.40	106.80	0.45	4.78
Crude Materials	SEPT	102.00	101.00	96.70	0.99	5.48
Capital Equipment	SEPT	118.80	118.80	114.30	0.00	3.94
Agricultural Prices - 1977 = 100						
Prices Received	SEPT	143.00	144.00	144.00	-0.69	-0.69
Prices Paid	SEPT	178.00	178.00	172.00	0.00	3.49
E. Monetary and Credit Aggregates**						
Total Reserves	3rd	0.20	-8.70	3.10		
M1	3rd	1.70	-5.60	5.20		
Commercial Banks						
Savings	3rd	-0.10	-14.20	7.90		
Small Denomination Time	3rd	10.60	29.00	11.60		
Large Denomination Time	3rd	1.80	17.70	18.20		
Thrift Institutions						
Savings	3rd	-6.90	-19.00	2.10		
Large Denomination Time	3rd	-9.70	5.90	3.90		
Debt Components						
Federal	3rd	5.40	6.90	7.00		
Nonfederal	3rd	8.00	7.80	9.90		
Interest Rates - Monthly						
Prime Rate - %	SEPT	10.50	10.50	10.00		
Discount Rate - %	SEPT	7.00	7.00	6.50		

* Seasonally Adjusted

** Annual rates of change, seasonally adjusted in percent.

SOURCES: BEA, BLS, Survey of Current Business, Federal Reserve Bulletin.

Quarterly Employment in Kansas

	1989 Q3	1989 Q2	1988 Q3	% Change From 1989 Q2	 1988 Q3
A. General Indicators					
Civilian Labor Force - Thou.	1281.34	1297.65	1276.17	-1.26	0.41
Employed - Thou.	1228.86	1241.85	1217.31	-1.05	0.95
Farm Employment - Thou.	66.37	59.33	63.93	11.85	3.81
Unemployed - Thou.	52.49	55.80	58.86	-5.94	-10.83
Initial Claims for Unemployment Insurance - Thou.	11.34	10.92	11.18	3.84	1.39
Average Work Week, Manufacturing - Hrs.	40.20	40.27	40.60	-0.17	-0.99
B. Industry Employment, in thousands					
All Industries	1049.43	1059.60	1032.17	-0.96	1.67
Manufacturing	184.97	184.43	182.00	0.29	1.63
Durable Goods	110.63	110.03	108.27	0.55	2.19
Fabricated Metal Production	10.97	11.37	11.43	-3.52	-4.08
Machinery (including Electrical)	30.23	30.03	29.33	0.67	3.07
Transportation Equipment	48.53	47.43	46.53	2.32	4.30
Nondurable Goods	74.33	74.40	73.73	-0.09	0.81
Food and Kindred Products	26.57	26.60	26.50	-0.13	0.25
Meat Products	14.27	14.43	14.20	-1.15	0.47
Printing and Publishing	20.70	20.77	20.13	-0.32	2.81
Petroleum and Coal	3.00	3.00	3.03	0.00	-1.10
Mining	9.97	9.93	10.49	0.34	-5.02
Oil and Gas Extraction	8.63	8.63	8.97	0.00	-3.72
Contract Construction	45.07	42.27	46.17	6.62	-2.38
Transportation and Public Utilities	65.80	65.60	64.77	0.30	1.60
Wholesale Trade	68.13	68.70	68.60	-0.82	-0.68
Retail Trade	191.87	191.83	191.03	0.02	0.44
Finance, Insurance, and Real Estate	58.93	58.40	58.73	0.91	0.34
Services	222.53	221.43	214.00	0.50	3.99
Federal Government	30.43	30.17	29.13	0.88	4.46
State and Local Government	171.73	186.83	167.27	-8.08	2.67

SOURCES: BLS, Ks. Dept. of Human Resources.

Quarterly Kansas Retail Sales Subject to Sales Tax*

	1989 Q3	1989 Q2	1988 Q3	% Change From 1989 Q2	 1988 Q3
Sales, in Millions					
Apparel	472.35	473.26	443.72	-0.19	6.45
Automotive	3639.24	3508.00	3733.27	3.74	-2.52
Food	4268.18	4436.97	4302.47	-3.80	-0.80
Furniture	892.22	891.57	1336.06	0.07	-33.22
General Merchandise	2926.90	3015.92	2396.76	-2.95	22.12
Lumber and Building Materials	1385.75	1293.64	1412.27	7.12	-1.88
Professional and Personal Services	1597.41	1472.48	1073.29	8.48	48.83
Public Utilities	352.63	443.45	807.75	-20.48	-56.34
Unclassified	1467.89	1489.27	1644.88	-1.44	-10.76
Farm and Garden Products	22.96	24.71	23.97	-7.09	-4.20
Manufacturing and Trading	940.12	921.29	1055.26	2.04	-10.91
Miscellaneous	24.52	7.95	44.10	208.29	-44.41
Total	17990.17	17978.50	18273.80	0.06	-1.55

NOTE: Retail sales figures are based on sales tax collections. Actual and reported retail sales may vary.

* Annual Rates

SOURCE: Ks. Dept. of Revenue.

Quarterly Personal Income in Kansas*

				% Change From	
	1989 Q2	1989 Q1	1988 Q2	1989 Q1	1988 Q2
A. Personal Income					
Total - Mil. $	41503	40642	39434	2.12	5.25
Nonfarm Income - Mil. $	40260	39533	37731	1.84	6.70
Farm Income - Mil. $	1243	1108	1702	12.18	-26.97
Average Weekly Earnings, Mfg.** - $	424	419	415	1.05	2.05
B. Earnings by Industry, in Millions					
Nonfarm	27312	26874	25952	1.63	5.24
Farm	1243	1108	1702	12.18	-26.97
Manufacturing	5400	5384	5288	0.30	2.12
Durable Goods	3338	3350	3331	-0.36	0.21
Nondurable Goods	2061	2033	1956	1.38	5.37
Mining	317	301	327	5.32	-3.06
Contract Construction	1500	1536	1579	-2.34	-5.00
Transportation and Public Utilities	2355	2327	2274	1.20	3.56
Wholesale Trade	2077	2053	1933	1.17	7.45
Retail Trade	2708	2682	2590	0.97	4.56
Finance, Insurance, and Real Estate	1611	1570	1575	2.61	2.29
Services	6050	5878	5514	2.93	9.72
Federal Government	901	891	817	1.12	10.28
State and Local Government	708	706	695	0.28	1.87

* Seasonally adjusted, at annual rates
** Not seasonally adjusted.

SOURCES: BEA, Ks. Dept. of Human Resources.

Monthly Kansas Agricultural Indicators*

				% Change From	
	1989 September	1989 August	1988 September	1989 August	1988 September
Prices Received					
All Farm Products - 1977 = 100	171	175	174	-2.29	-1.72
All Crops - 1977 = 100	147	134	157	9.70	-6.37
Wheat - $/Bu.	3.68	3.79	3.57	-2.90	3.08
Sorghum Grain - $/Cwt.	3.66	3.70	4.23	-1.08	-13.48
Corn - $/Bu.	2.22	2.31	2.69	-3.90	-17.47
Soybeans - $/Bu.	7.83	5.81	8.22	34.77	-4.74
All Hay - $/Ton	77.00	78.00	90.00	-1.28	-14.44
Livestock and Products - 1977 = 100	186	191	185	-2.62	0.54
All Beef Cattle - $/Cwt.	71.20	72.90	71.40	-2.33	-0.28
Steers and Heifers - $/Cwt.	72.30	73.80	72.70	-2.03	-0.55
Calves - $/Cwt.	92.30	99.40	92.40	-7.14	-0.11
Hogs - $/Cwt.	39.90	45.20	38.60	-11.73	3.37
Milk - $/Cwt.	13.30	12.40	11.80	7.26	12.71

* Not seasonally adjusted.

SOURCE: Ks. Crop and Livestock Reporting Service.

Quarterly Employment and Sales for MSAs and Counties

				% Change From	
Area	1989 Q3	1989 Q2	1988 Q3	1989 Q2	1988 Q3
A. Wichita SMSA					
Civilian Labor Force - Thou.	260.69	260.97	254.81	-0.11	2.31
Employed - Thou.	249.48	249.66	242.05	-0.07	3.07
Unemployed - Thou.	11.21	11.31	12.76	-0.83	-12.11
Rate - %	4.33	4.33	5.03		
Retail Sales - Mil. $	944.97	941.29	915.79	0.39	3.19
B. Kansas Portion of Kansas City SMSA					
Civilian Labor Force - Thou.	327.96	331.42	327.04	-1.05	0.28
Employed - Thou.	315.01	316.97	311.95	-0.62	0.98
Unemployed - Thou.	12.95	14.46	15.08	-10.42	-14.16
Rate - %	3.97	4.33	4.63		
Retail Sales - Mil. $	1094.20	1075.74	1098.91	1.72	-0.43
C. Topeka SMSA					
Civilian Labor Force - Thou.	92.05	93.70	92.17	-1.77	-0.14
Employed - Thou.	87.79	89.57	87.90	-1.99	-0.13
Unemployed - Thou.	4.26	4.13	4.27	2.99	-0.28
Rate - %	4.63	4.43	4.63		
Retail Sales - Mil. $	328.78	330.59	328.04	-0.55	0.23
D. Lawrence SMSA					
Civilian Labor Force - Thou.	40.72	41.74	39.82	-2.45	2.26
Employed - Thou.	39.32	40.24	38.35	-2.29	2.53
Unemployed - Thou.	1.40	1.50	1.47	-6.94	-4.92
Rate - %	3.43	3.63	3.70		
Retail Sales - Mil. $	119.91	117.08	115.31	2.42	3.99
E. Riley County--Manhattan Area					
Civilian Labor Force - Thou.	27.13	28.51	27.26	-4.84	-0.47
Employed - Thou.	26.27	27.58	26.10	-4.73	0.68
Unemployed - Thou.	0.85	0.93	1.16	-8.03	-26.36
Rate - %	3.13	3.27	4.23		
Retail Sales - Mil. $	62.62	63.21	61.06	-0.92	2.57
F. Reno County--Hutchinson Area					
Civilian Labor Force - Thou.	30.98	30.92	31.18	0.20	-0.63
Employed - Thou.	29.61	29.40	29.63	0.70	-0.06
Unemployed - Thou.	1.38	1.52	1.56	-9.41	-11.55
Rate - %	4.43	4.90	5.00		
Retail Sales - Mil. $	102.86	105.34	104.47	-2.36	-1.54
G. Crawford County--Pittsburg Area					
Civilian Labor Force - Thou.	16.86	17.01	16.83	-0.88	0.22
Employed - Thou.	16.03	16.16	15.98	-0.79	0.33
Unemployed - Thou.	0.83	0.85	0.85	-2.66	-1.81
Rate - %	4.93	5.00	5.03		
Retail Sales - Mil. $	45.80	45.23	45.45	1.26	0.76
H. Lyon County--Emporia Area					
Civilian Labor Force - Thou.	19.19	19.65	18.97	-2.33	1.15
Employed - Thou.	18.47	18.78	18.13	-1.64	1.86
Unemployed - Thou.	0.72	0.87	0.84	-17.19	-14.25
Rate - %	3.77	4.47	4.43		
Retail Sales - Mil. $	53.37	52.39	58.85	1.88	-9.31
I. Saline County--Salina Area					
Civilian Labor Force - Thou.	27.16	27.89	27.72	-2.64	-2.04
Employed - Thou.	25.97	26.57	26.40	-2.29	-1.63
Unemployed - Thou.	1.19	1.32	1.33	-9.66	-10.16
Rate - %	4.37	4.73	4.77		
Retail Sales - Mil. $	106.08	105.23	104.81	0.80	1.21
J. Barton County--Great Bend Area					
Civilian Labor Force - Thou.	14.56	14.65	14.36	-0.64	1.38
Employed - Thou.	13.92	13.97	13.60	-0.37	2.35
Unemployed - Thou.	0.64	0.68	0.76	-6.17	-15.97
Rate - %	4.40	4.63	5.30		
Retail Sales - Mil. $	58.33	59.95	59.93	-2.70	-2.66
K. Montgomery County--Coffeyville Area					
Civilian Labor Force - Thou.	18.27	18.37	17.83	-0.54	2.43
Employed - Thou.	17.20	17.37	16.72	-0.93	2.93
Unemployed - Thou.	1.06	1.00	1.12	6.30	-4.98
Rate - %	5.80	5.47	6.27		
Retail Sales - Mil. $	53.83	52.57	52.30	2.40	2.93

SOURCES: Ks. Dept. of Human Resources, Ks. Dept. of Revenue.

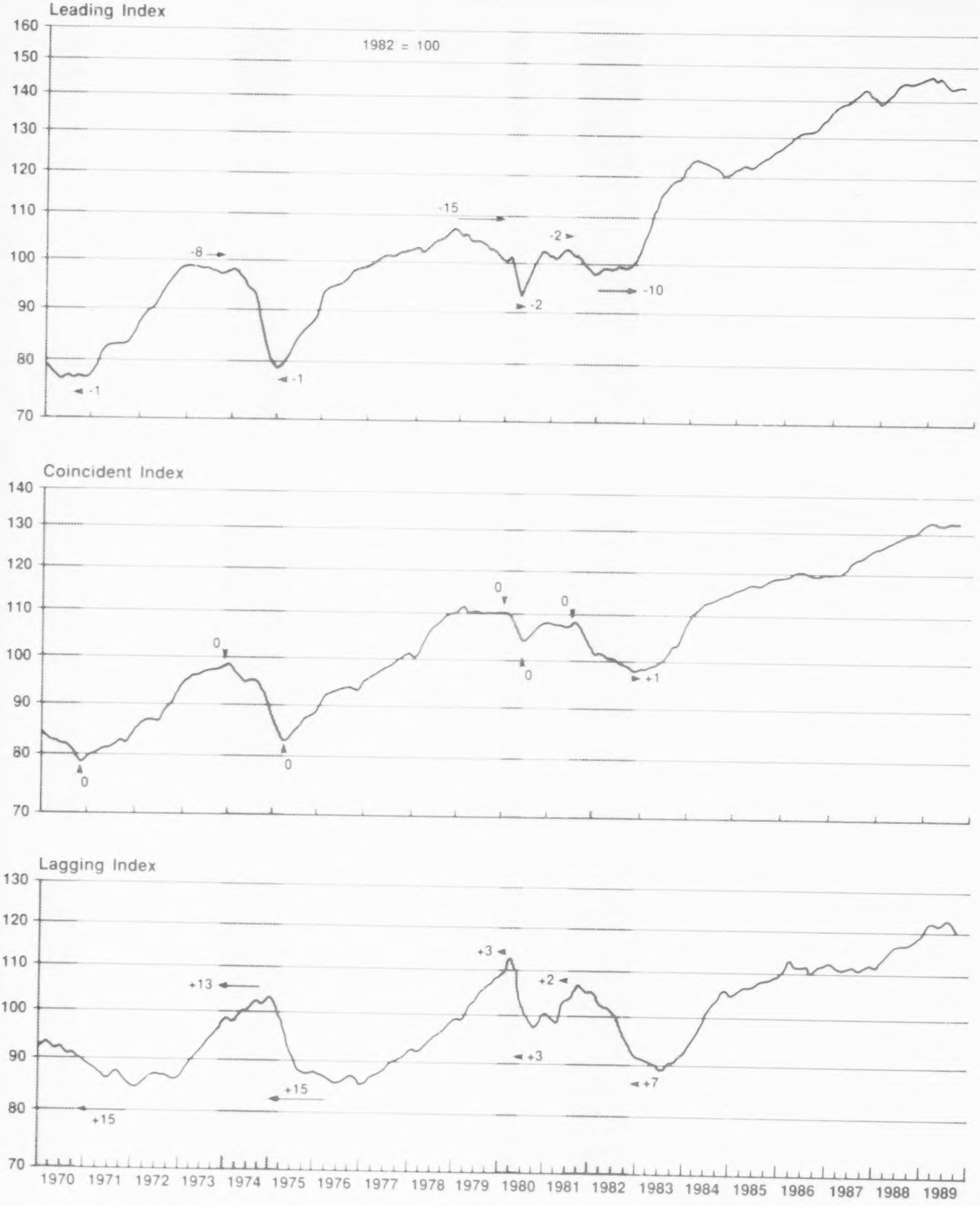
Quarterly Banking and Savings and Loan Activity in Kansas*

	1989 Q3	1989 Q2	1988 Q3	% Change From 1989 Q2	 1988 Q3
Federal Reserve Member Banks					
A. Kansas, in Millions					
Total Deposits	38480.0	37828.0	37882.8	1.72	1.58
Total Checkable	6020.3	6067.0	6187.7	-0.77	-2.70
Demand Deposits	2909.7	2918.0	3027.5	-0.29	-3.89
Other Checkable	3110.7	3149.0	3159.6	-1.22	-1.55
Small Time and Savings	26081.7	25363.7	25481.8	2.83	2.35
Large Time	6378.0	6397.3	6205.1	-0.30	2.79
B. Kansas City, KS, in Millions					
Total Loans	1761.16	1749.98	1786.37	0.64	-1.41
Real Estate	979.61	953.64	922.08	2.72	6.24
Commercial and Industrial	524.28	523.40	567.18	0.17	-7.56
Consumer	92.93	100.79	97.54	-7.80	-4.73
Total Deposits	2086.36	2045.11	1982.00	2.02	5.27
Demand Deposits	202.34	212.66	234.27	-4.85	-13.63
Time and Savings	1203.12	1159.81	1119.56	3.73	7.46
C. Topeka, in Millions					
Total Loans	391.50	388.69	383.85	0.72	1.99
Real Estate	133.32	130.88	110.09	1.87	21.10
Commercial and Industrial	133.17	132.17	146.17	0.76	-8.90
Consumer	71.30	67.37	78.96	5.84	-9.69
Total Deposits	526.45	509.86	523.67	3.25	0.53
Demand Deposits	143.05	144.51	164.11	-1.01	-12.83
Time and Savings	243.39	230.71	218.19	5.50	11.55
D. Wichita, in Millions					
Total Loans	1365.14	1372.19	1359.58	-0.51	0.41
Real Estate	308.41	301.69	273.53	2.23	12.75
Commercial and Industrial	463.91	486.27	507.99	-4.60	-8.68
Consumer	436.24	425.74	431.90	2.47	1.00
Total Deposits	2084.46	2011.94	1920.58	3.60	8.53
Demand Deposits	443.61	453.02	459.88	-2.08	-3.54
Time and Savings	1092.75	1049.30	927.92	4.14	17.76
Savings and Loan Activity					
E. Kansas, in Millions					
Total Assets	22746.00	22768.57	22916.13	-0.10	-0.74
Mortgage Loans	14334.65	14354.97	14695.83	-0.14	-2.46
F. Kansas City, KS, in Millions					
Total Assets	2032.65	2444.27	1912.97	-16.84	6.26
Mortgage Loans	1567.35	1907.27	1489.77	-17.82	5.21
G. Topeka, in Millions					
Total Assets	3477.95	3421.40	3359.93	1.65	3.51
Mortgage Loans	3049.30	2968.20	2922.33	2.73	4.34
H. Wichita, in Millions					
Total Assets	1814.95	1855.80	1616.83	-2.20	12.25
Mortgage Loans	1319.75	1353.80	1128.80	-2.52	16.92

* The data for banks above pertain only to Federal Reserve member banks of Kansas and do not represent all commercial banking in the state. Since 1980, these data have covered approximately 50 percent of the state's banking activity.

SOURCES: Federal Reserve Bank of Kansas City, Federal Home Loan Bank of Topeka.

U.S. Composite Indexes

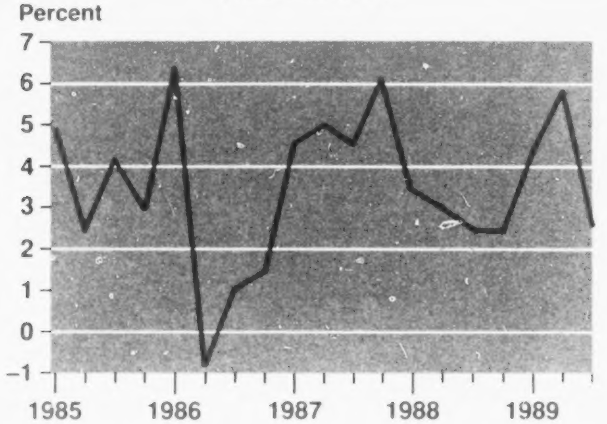


Source: Bureau of Economic Analysis, *Business Conditions Digest*

Note: Numbers entered on the chart indicate length of leads (—) and lags (+) in months from reference turning dates. Shading indicates periods of recession.

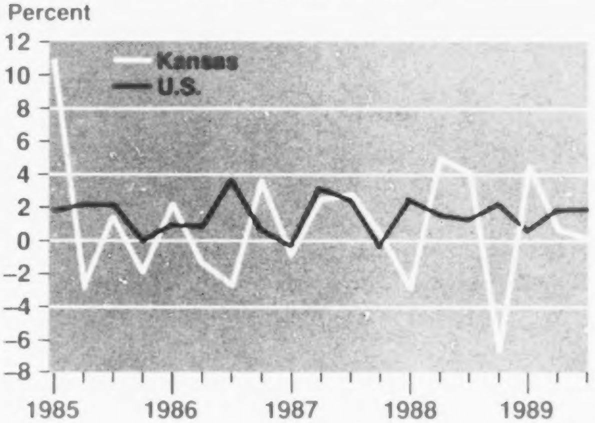
Average Annual Growth Rate of GNP

(1982 Dollars)



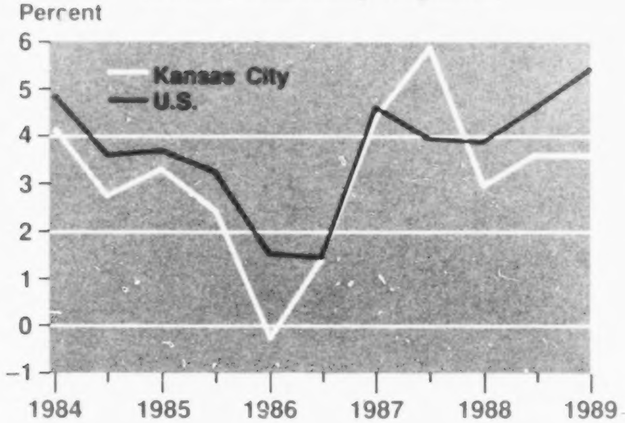
Growth of Retail Sales

(In Current Dollars)

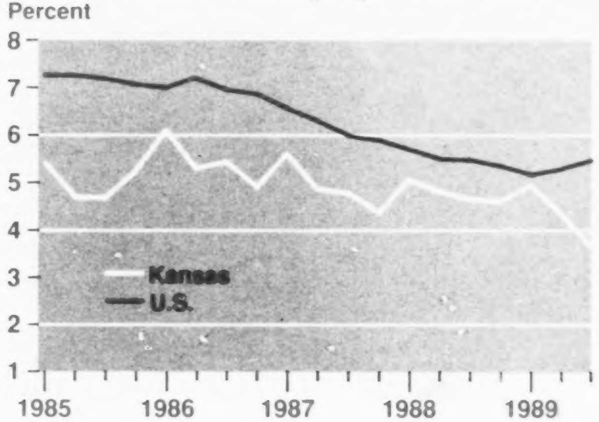


Rate of Inflation

(CPI-U, Seasonally Adjusted)



Civilian Unemployment Rate



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The Editorial Review Board welcomes submissions of original manuscripts as well as reports on research and opinion pieces. The style, however, should emphasize exposition rather than technical details. All submissions will be reviewed initially by the editorial staff and, when judged appropriate, will be sent to referees who are knowledgeable about the content.

Manuscripts for consideration should be typed, double-spaced, and submitted in triplicate; manuscripts may also be submitted on diskettes, in WordPerfect. In general, length should not exceed three thousand words.

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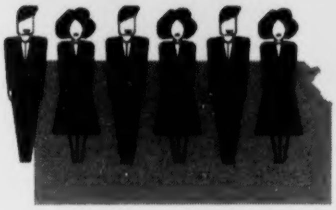
The Training Needs of the Kansas Work Force



Charles E. Krider
M. Elizabeth Stella
Ronald Ash
Genna M. Ott

Dr. Krider is a professor in the School of Business at the University of Kansas and director of business research at the Institute for Public Policy and Business Research. Dr. Stella and Genna M. Ott are research associates at the Institute. Dr. Ash is an associate professor in the School of Business.

Introduction

One of Kansas' major strengths is its work force, for the state ranks higher than the national average in work force quality.[1] This quality is due in part to the distinction of its educational institutions and to the use of technical training institutions to maintain a competitive work force. A strong educational system that is responsive to business' needs is critical in preserving the state's ability to offer industry a well-trained work force.

The demands on the technical education system will increase in the 1990s for several reasons. Demographic changes indicate that the growth in the labor force will slow and labor shortages, not unemployment, will be the major concern.[2] The composition of the labor supply will change as most of the growth will come from minorities and women.[3] The skill requirements of business are increasing because of technological advances.[4] Changes in management practices indicate that workers will have a greater responsibility for how their work is performed and for the quality of their work. International competition, particularly from Japan and Europe, will continue, increasing the importance of technical education in the state's economic development efforts.

The purpose of this paper is to decide how well the state's postsecondary vocational and technical training system meets the state's needs for a well-trained, adaptable work force. The basis for the paper is a survey of state-supported vocational education training institutions and of Kansas business work force training needs.[5]

Table 1
Sources of Technical and Vocational Training

Source	% of Total Sample
Professional association seminars	76%
Vendors (equipment & system suppliers)	71
Community college	64
Consultants/other commercial trainers	62
Area vocational technical school	61
State university	47
Local high school	23
Private college/university	22
Apprenticeship training (union training)	20
Private vocational technical school	17
Pittsburg State University	15
Other	13
Washburn University	10
Kansas College of Technology	10

Source: Institute for Public Policy and Business Research, Business Survey, 1989.

Methodology

Public-supported providers of postsecondary vocational and technical training--19 community colleges, 16 area vocational and technical schools (AVTS), Pittsburg State University, Washburn University, and Kansas College of Technology--were surveyed through a combination of written surveys and on-site visits to obtain enrollment, budgetary, and curriculum statistics. The training needs of 618 Kansas firms were also assessed. Using a data base furnished by the Kansas Department of Human Resources, a sample of firms was compiled which included businesses judged to be more likely to utilize the technical training system but eliminated firms with fewer than five employees and firms with certain SIC codes (personal services, miscellaneous retail, eating and drinking places, food stores, membership organizations). The sample was also over-weighted for manufacturing firms (320 manufacturers, 298 nonmanufacturers).

Results

1. Source and Evaluation of Training

Fifty-four percent of the firms surveyed intentionally employed community college and AVTS trainees; forty-nine percent of the firms utilized technical or vocational training programs to upgrade the skills of their current employees. Most firms investing in training used professional association seminars, vendor training, and community colleges (Table 1). The firms more likely to obtain training for their employees included large and medium-sized firms, firms expecting technology impact (technology-

Table 2
Satisfaction with Technical or Vocational Skills of Trained Employees

Intentionally Hire from:	Level of Satisfaction % Dissatisfied	 % Satisfied
Community College	9%	91%
AVTS	11	89
Pittsburg State	1	99
Washburn University	8	92
Kansas College of Technology	9	91

Source: Institute for Public Policy and Business Research, Business Survey, 1989.

driven firms), and firms using customized training. Small firms and firms who were not technology-driven did not utilize the training system as much.

Those firms hiring trainees from the public technical and vocational institutions were satisfied with the skills of those employees (Table 2). High levels of satisfaction would be expected of firms who intentionally hire trainees from these institutions, so all firms were asked to evaluate the quality of technical and vocational training from all available external sources (those listed in Table 1). On average, firms rated all sources as adequate; the only exception was training offered at local high schools which was rated midway between "needs improvement" and "adequate." Manufacturers rated training received from high schools, community colleges, private colleges/universities, and consultants/commercial trainers lower than did nonmanufacturers.

Table 3
Reasons Firms Do Not Invest in Human Capital

Reason	Percentage of Firms
Do on-the-job training	88%
Developed in-house training	75
Employees haven't needed training	41
Can't find training that meets needs	38
Training is too expensive	25
Other	13

Source: Institute for Public Policy and Business Research, Business Survey, 1989.

For the 51 percent of the firms surveyed who did not utilize the technical and vocational training system within the last five years, on-the-job training and in-house training programs were most frequently used (Table 3). These firms reported that the lack of training designed to meet their needs was a barrier to utilizing external training sources. Technology-driven firms also utilized external training sources less because training was too expensive. Manufacturers and technology-driven firms were more likely to report that their employees did need training.

2. Work Force Skill Improvement

Sixty-five percent of firms surveyed reported that technology changes will increase the level of skills needed by their employees over the next five years. Because of the impact of rapid technological change, Kansas employers, like employers nationally, report a moderate to severe gap between the skill of newly-hired and existing employees and the skill levels needed by the firm (Table 4). These gaps exist despite the fact that adults are returning to educational institutions in increasing numbers. Table 5 demonstrates how the survey of vocational-technical programs showed dramatic increases in adult enrollment across program areas. These results, which reflect the significant shift in population served by vocational education institutions, indicate the work force is seeking training or retraining in large numbers.

The problem of finding skilled employees is serious--more serious than two or three years ago--and is projected to become more severe in the near future. Probably because large firms can attract better trained employees, small and medium-sized firms perceived the gap between qualifications of newly hired workers and the needs of their businesses to be significantly larger than did large firms. Overall, medium-sized firms perceived a greater problem with the availability of skilled employees than did large and small firms, and manufacturing firms reported a larger gap between the qualifications of newly hired workers and the firm's skill needs than did nonmanufacturing firms. Availability of skilled workers was a significantly greater problem for firms which were technology driven than for firms which were not.

To further define improvements needed in the Kansas work force, firms were asked to indicate skill areas in which employees needed improvement (Table 6). Manufacturing and technology-driven firms reported their newly-hired employees need improvement in technical, machine, and trade/craft skills, but, like many firms around the country, they were particularly concerned about their employees' basic academic skills and general work skills. According to the surveyed employers, employees who have been with the firms for some time will need retraining in basic academic skills and general work skills to cope with technological changes. (Table 7). Manufacturers and technology-driven firms predicted current employees would need retraining in technical and microcomputer skills.

Educators also see the need for remedial education. When asked to rate entering vocational students' command of basic academic skills (reading, writing, and mathematics), about 80 percent of the surveyed institutions rated them as fair or poor; by the time vocational students exited the system, 55 percent of the institutions rated them as still having only a fair command of the basic skills.

AVTS and community colleges pro-

Table 4
Evaluation of Work Force Quality and Quantity

Evaluation	Percentage of Firms
Moderate to severe gap between skills of newly hired employees and needs of firm	58%
Moderately to extremely difficult to find skilled employees	51%
Slightly to much more difficult to hire today than two to three years ago	69%
Slightly to much more difficult to hire in the next two to three years	70%

Source: Institute for Public Policy and Business Research, Business Survey, 1989.

vide training in basic academic skills for under-prepared students, and these courses furnish students with the basic reading, writing, and computational skills necessary for them to survive in a changing and highly technical society. In 1987, more than 3,000 students enrolled in remedial math, almost 2,500 took a remedial English course, and more than 1,400 enrolled in remedial reading. These enrollment figures only reflect the number of under-prepared students who voluntarily enroll in remedial courses: lack of funding discourages schools from requiring remedial training for all under-prepared students. About 28 percent of all entering vocational students require remedial and developmental courses; over half of these students are 18 to 21 years of age, and over 35% are 22 to 39 years of age.[6]

Enrollment data obtained from vocational education institutions showed that postsecondary and adult students are taking manufacturing-related courses in increasing numbers (Table 8); however, manufacturing-related program enrollments represent a very small percentage of total enrollments, 1.7 percent, despite the fact that manufacturing is a key industry in the state.

To summarize, the business survey results showed that, at a time when workforce skill requirements are increasing and predicted to increase further as technology changes, employers report that the work force's motivation, attitudes toward work, work habits, and goals need improvement. The survey of educational institutions showed that adult enrollments are increasing as workers seek to improve their skills: the next logical question, therefore, is what should the training system do to ensure that these adults, as well as the general work force, are prepared to meet the needs of Kansas' employers.

Table 5
Area Vocational-Technical School and Community College Adult Enrollment

	1984-1985	1987-1988	% Change
AVTS	4,256	16,165	280%
Comm. College	590	10,763	172%
Total	4,846	26,928	456%

Source: Institute for Public Policy and Business Research, Vocational Institution Survey, Spring, 1989.

3. Work Force Training Needs

Several issues must be addressed if the vocational-technical training system is to meet the training needs of Kansas business and industry. Areas of particular concern include customized training, funding, and quality of programs, equipment, and instructors.

Customized Training. As stated earlier, nearly 40 percent of firms who had not used technical and vocational training for their employees reported that the training they needed was unavailable, suggesting that customized training, designed to meet the needs of a particular client, is essential. The training can be designed to present specific information or teach particular skills, and it can be scheduled at times suited to the particular needs of the client.

Thirty-six percent of firms surveyed reported using customized training in the past five years. More large firms (62 percent) used customized training than small (21 percent) and medium-sized firms (40 percent). Manufacturers used customized training more than non-manufacturers, and firms in urban and mid-sized counties used it more frequently than firms in rural counties, probably because smaller firms and firms in rural areas did not have as much access to customized training as other firms. Seventy-eight percent of the firms which did not use customized training considered it to be more cost-effective than other forms of training.

Firms usually find out about customized training by promotion or marketing. Since community colleges and AVTS do not, for the most part, have well-organized mechanisms for marketing customized training, and may actually choose not to aggressively market it due to the funding risks involved, it is not surprising that most firms reported they were not contacted about it by these institutions in the last three years. Sixty-five percent reported never being

Table 6
Skill Improvements Needed by Newly Hired Employees

Area Needing Improvement	Total Group Percentage	Percentage of Subgroups		
		Mfg.	Nonmfg.	Tech. Driven*
Goal setting and personal motivation	79%	77%	82%	84%
Proper attitudes toward work and work habits	77	79	75	81
Organizational effectiveness and leadership	75	73	77	79
Listening & oral communication	72	70	74	78
Problem solving	70	73	66	76
Teamwork	70	71	70	76
Adaptability/flexibility	66	63	69	71
Interpersonal relations	60	57	63	63
Comprehension/understanding	60	60	60	68
Writing	60	55	66	63
Business/management	57	53	61	62
Computation	52	54	49	58
Microcomputer	47	47	48	54
Reading	43	45	42	46
Technical	42	50	32	51
Skilled trades/crafts	40	50	30	48
Mechanical	38	46	28	43
Machine operation	37	50	22	40
General labor	31	34	27	35
Clerical	29	25	33	32
Electrical	25	32	18	31
Mainframe computer	22	21	24	27
Other	8	9	7	9

Source: Institute for Public Policy and Business Research, Business Survey, 1989.

*Technology driven firms are those firms that responded that technology changes will increase the level of technical or vocational skills needed by their employees over the next five years.

contacted by community colleges and 70 percent were never contacted by AVTS; also, large and medium-sized firms were more likely to be called upon by community colleges and AVTS than were small firms.

Educational institutions provided data on "customized" training; their data included both customized training, as well as employee enrollment in regularly-scheduled programs or courses, thereby inflating the amount of customized training reported. Over a two year period, academic years 1986-87 and 1987-88, community colleges showed the largest increase in different types of training offered (170 to 460 courses), number of instructional hours (414,090 to 911,403 hours), and number of employees trained (14,817 to 30,672). AVTS showed increases in types of training (125 to 191 courses), number of instructional hours (278,306 to 302,610), and a decrease in number of employees trained (11,234 to 9,452). Dramatic increases in types of training needed and in number of employees trained sends community colleges a strong message that employee training is needed.

Funding. Sixty-eight percent of the firms surveyed reported that they paid the total cost of employee training, 20 percent used a combination of their own and public funds, 19 percent used Job Training Partnership Act (JTPA) funds, and 7 percent used Kansas Industrial Training (KIT) funds. Firms which are solely Kansas firms and not part of a larger non-Kansas corporation spent a median amount of $1,000 on employee training; the median amount for Kansas plus non-Kansas-owned firms was $2,000. Since the median number of employees for the entire sample, that is, Kansas plus non-Kansas owned firms, was 60 employees, an average of $33.33 was spent on training each employee.

Clearly, investment in human capital is low. Large firms spent significantly more on training than small firms and reported using KIT funds more than did medium-sized and small firms. Large and medium-sized firms used JTPA funds and a combination of their own and public funds to a significantly greater extent than small firms; thus, large firms were more successful than small and medium-sized firms in accessing external funding sources to support training. To promote investment in human capital, small and medium-sized firms, the backbone of the Kansas economy, need access to external funding sources to help support training costs; without this support they will not remain competitive. If they do not invest in their employees because of funding difficulty, they will lose their competitive edge; if they invest in employee training and do not have external funding sources similar to those obtained by large companies, they cannot compete with large companies in operating costs.

The recently approved Business and Industry Training Program is a mechanism allowing community colleges and AVTS and other state technical institutions to meet businesses' needs for customized training. Under this program, schools can submit requests for the training, be assured of quick processing by the Department of Education and, after getting the Department's approval, gain the state aid they need. This program will provide valuable financial support for businesses--especially small businesses--who seek training for employees.

Quality of Training. Educators reported that their training programs are keeping pace with changing job skill requirements, and firms generally rated the quality of technical and vocational education in Kansas as adequate. On the other hand, 22 percent of the firms reported that programs and courses needed improvement, 15 percent reported instructors needed improvement, and 25 percent reported equipment needed improvement. In addition, 83 percent of all firms agreed that it was important for community colleges and AVTS to train with technically advanced equipment. These results suggest that providing adequate equipment for training may become an important issue as technological changes make it more difficult for schools and instructors to access increasingly sophisticated equipment. When firms were asked what changes would increase the likelihood of their using training services from community colleges or AVTS, a large percentage reported moderate interest in receiving: 1) more information about the training programs available; 2) state assistance in reducing the cost of training; 3) greater flexibility in scheduling of training; 4) greater relevance of training to firms' training needs; 5) more up-to-date equipment; and 6) more highly qualified instructors.

4. Private-Public Partnership in Meeting Work Force Training Needs

While firms reported that the state's vocational-technical training system should improve equipment and instructors' qualifications, they were limited in what they were able or willing to do to help make the system more responsive to their needs. Executives who were slightly to moderately interested in serving on advisory boards included those from large firms, firms who intentionally employed community college and AVTS trainees, and manufacturing firms who were technology driven or used customized training. Firms of all types had only slight interest in donating equipment for programs or donating staff time to assist with teaching courses, but large firms and manufacturing firms were moderately interested in assisting with development of new community college and AVTS training programs. Results of the survey also indicated that firms which intentionally employed community college and AVTS trainees, were technology driven, used technical and vocational training, and/or used customized training, had a significantly greater interest in working with community colleges and AVTS. Large and medium-sized firms and firms located in mid-sized and urban counties were significantly more interested in some degree of interaction with vocational and technical education institutions.

Table 7
Skill Improvements Needed by Current Employees to Cope with Technological Change Over the Next Five Years

Area Needing Improvement	Total Group Percentage	Percentage of Subgroups Mfg.	Nonmfg.	Tech. Driven
Problem solving	72%	72%	71%	80%
Adaptability/flexibility	72	70	75	79
Teamwork	71	72	70	77
Goal setting and personal motivation	71	69	72	77
Proper attitudes toward work and work habits	70	71	69	76
Organizational effectiveness and leadership	68	67	70	75
Comprehension/understanding	68	67	68	75
Microcomputer	67	66	69	75
Listening & oral communication	65	64	66	70
Business/management	58	53	65	65
Interpersonal relations	56	53	60	62
Technical	56	63	48	66
Computation	56	59	54	64
Reading	51	52	49	57
Writing	49	45	54	53
Machine operation	44	56	30	49
Skilled trades/crafts	41	46	34	48
Mechanical	40	47	33	46
Clerical	35	31	40	39
Mainframe computer	35	34	36	38
Electrical	33	39	25	38
General labor	30	33	27	33
Other	8	9	7	9

Source: Institute for Public Policy and Business Research, Business Survey, 1989.

While the survey of educators revealed that the vocational educational community thinks programs are keeping pace with changing job skill requirements, these same educators report that more business input is needed. When asked to rank issues facing them, leaders of vocational education institutions ranked access to and cooperation with business as the most important issue facing Kansas' training system.

Implications

These results indicate a willingness on the part of business to participate in the development and improvement of training programs and an enthusiasm on the part of educators to receive business input. Mechanisms to encourage meaningful business participation need to be developed to facilitate business input into the vocational and technical education system. Meaningful partnerships would ensure that the system would be more market driven and responsive to workforce training needs.

While firms judge the current technical education system to be adequate, signs of strain or contradiction were detected. Business and industry need training designed to meet their workforce training needs: basic academic skills, work habits and attitudes, and

Table 8
AVTS and Community College Adult Enrollment Change by Career Area

Career Area	1984-1985 N (%)*	1987-1988 N (%)*	% Change
Agriculture	24 (0.5)	490 (1.8)	1941.7
Mining		75 (0.3)	
Construction	271 (5.6)	3,227 (12.0)	1090.8
Manufacturing	123 (2.5)	446 (1.7)	262.6
Transportation/Utilities	246 (5.1)	472 (1.8)	91.9
Retail	19 (0.4)	173 (0.6)	810.5
Finance, Ins., Real Estate		105 (0.4)	
Business Services	2,029 (41.9)	11,010 (40.9)	442.6
Health, Ed. and Soc. Services	1,266 (26.1)	7,753 (28.8)	512.4
Other Services	797 (16.4)	2,439 (9.1)	206.0
Public Administration	71 (1.5)	738 (2.7)	939.4
Total	4,846	26,928	455.7
Mean	372.77	2,244.00	

*Percentage of total enrollment.

Source: Institute for Public Policy and Business Research, Vocational Institution Survey, Spring, 1989.

increased technical skills. A more diversified population will need to be served. Adults will continue to utilize the system in increasing numbers to obtain basic literacy and technical skills and to upgrade academic and specialized skills. The system may be on the brink of having programs, instructors, and equipment which are unable to keep up with the pace of these changes.

Acknowledgements

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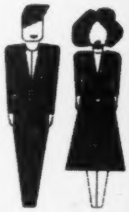
Policy Options for Improving Kansas Work-Force Preparation



Charles E. Krider
M. Elizabeth Stella

Dr. Krider is a professor in the School of Business at the University of Kansas and director of business research at the Institute for Public Policy and Business Research. Dr. Stella is a research associate at the Institute.

This article presents policy options that arose out of a study on work-force training in Kansas and the needs of Kansas' employers for major changes in the state's vocational-technical education system.[1] For Kansas to remain competitive in the changing economy of the 1990s, its workforce must be adequately trained to meet the challenges of new technology. These policy options do not ttempt to identify specific areas of skill hortages nor which particular training rograms should be expanded; instead, hey focus upon improvements in the ystem that, if implemented, would enable the state to address skill shortages n a continuing basis throughout the 990s. The policy options address the ollowing major areas:

1. Training programs - integration of asic academic skill training, technical kill training, and competency-based raining;

2. Funding - modernize funding sysems to provide incentives for compeency-based training and encourage program development and expansion in reas having greatest economic developnent impact;

3. Customized training - encourage nechanisms that enable community coleges and Area Vocational Technical Schools (AVTS) to respond more effecively to the growing need for customzed training;

4. System coordination - encourage rogram cordination between secondary nd postsecondary institutions and beween different types of postsecondary nstitutions to produce a well-coordinated ystem;

5. Business role - encourage business-echnical education partnerships to ensure nput in defining competency levels for raining, faculty development, equipment lecisions, and training program focus nd content.

Training Programs

Basic Academic Skill Training

Goal:

All students in postsecondary ocational-technical programs should cquire both basic academic skills and echnical skills.

Policy options:

1. Vocational-technical programs hould integrate training of basic cademic skills, such as reading, omputation, communication, reasoning nd problem solving, with technical kills.

Rationale: The skills that employees nust have are changing as the work place changes. Because the time it takes for half of a worker's skills to become obsolete is short--perhaps as short as one year--business and industry must have employees who are able and willing to learn new skills. Many workers, however, do not have the basic academic skills that will allow them to adapt to the demands of increasingly complex jobs. If students enter the postsecondary level or adults re-enter the training system underprepared in basic academic skills, then vocational-technical programs must incorporate training in these skills with the technical skill training.

2. Students entering vocational-technical programs should be tested on predetermined basic academic skills both when they enter a program and prior to receiving a degree or certificate. Students who cannot demonstrate basic academic skills should enter a remedial education program.

Rationale: About 80 percent of the vocational-education institutions rate students' academic skill performance level as poor to fair upon entry in postsecondary vocational-technical programs, and 54 percent rate them as only fair upon completion of programs. By testing for and requiring basic academic skill competency for acceptance into and completion of vocational-technical programs, work-force quality and adaptability will improve. Better-prepared students will also broaden their options for postsecondary training upon graduation from high school and be more capable of upgrading their skills at a later date. Fifty-eight percent of vocational-education institutions feel that students should be required to demonstrate minimum competence in basic academic skills for entry into programs and that deficiencies should be corrected. Unfortunately, students who demonstrate deficiencies are encouraged but not required to enroll in remedial programs.

3. Adults in all Kansas communities should have access to open-entry/open-exit basic education in literacy, math, and communication.

Rationale: Adults already in the work force and those wanting to enter it find that skill requirements are increasing and that they must return for training to upgrade literacy, math, and communication skills in order to retain jobs or to obtain promotions. Basic adult education in Kansas is grossly underfunded, with one million dollars supplied in federal funds and $50,000 from the state. The support must be increased to meet the literacy and basic academic skill needs of the adult population.

Secondary Technical Skill Training

Goal:

Secondary vocational-technical students should learn the principles of technology, applied math, applied science, in preparation for occupational training at the postsecondary level.

Policy options:

1. Establish and fund Technical Preparation Programs in secondary schools to provide secondary vocational-technical students with more rigorous training in principles of technology, applied math, and applied science.

Rationale: Tech-prep programs broaden the scope of vocational education and make students more employable by preparing them in at least one mechanical, engineering, industrial or practical field and by providing students with a high level of competence in mathematics, science, and communication. Rapid technological and product changes make workers' skills obsolete quickly; therefore, it makes sense to provide 17 year-old students with skills that enable them to learn new technical skills as needed. Implementation of programs should be supported by the State Department of Education in the form of curriculum development, teacher training, equipment, and materials.

2. Technical Preparation Programs should be coordinated with postsecondary programs at community colleges or AVTS by providing acceptance of credits or advanced placement in programs.

Rationale: Tech-prep programs should link the final two years of secondary education with the first two years of postsecondary education and give students an option to obtain a two-year degree or certificate. Jobs of the future will require workers at all levels to engage in lifelong learning, and the educational system must encourage people to enter and leave the system according to their needs.

Postsecondary Technological and Technical Skill Training

Goal:

All students in postsecondary vocational-technical programs should demonstrate competency in technical skills and underlying principles of technology specified by business as appropriate for the particular occupation.

Policy options:

1. Competencies for each technical course/program should be based upon skills identified by business and industry as being needed today, as well as upon the development of capacities that will enable students to adapt to the job in the future.

Rationale: Business and industry representatives should identify the skills and principles to be taught to ensure that the needs of the market place are met and students can perform more than one job. Providing the student with the knowledge and capability to perform skills across a broad range of closely-related jobs improves employability.

2. The Kansas State Department of Education should coordinate competency standards for all approved programs to ensure statewide consistency.

Rationale: The State Department of Education has compiled a profile of tasks identified by business and industry as requiring training for each approved vocational-education instructional program, in order to encourage statewide consistency in training. The list helps to identify the skills needed by workers in specific occupations and provides a guide for instruction. Standards must be maintained across the state to ensure that every program produces workers with minimum competencies in basic academic and technical skills.

Program Information and Evaluation

Goal:

Community colleges and AVTS should be held accountable for the quality of their programs as determined by (1) the ability of graduates to obtain employment in their area of training, and (2) meeting performance standards for skill acquisition.

Policy options:

1. Expand the Training Information Program so that wage and placement data are reported for every program at every institution providing postsecondary vocational-technical training.

Rationale: The Training Information Program currently provides wage and placement data, but only state-wide and not school-specific data are reported, so that students and parents interested in occupational data for their region have no readily-available source of information. Wage and placement data should be reported for every program at every postsecondary vocational-education institution to provide important data for students making education decisions.

2. Performance standards for vocational programs should be set by the State Department of Education in terms of competencies in basic academic skills, occupational skills, and job placements.

Rationale: Having performance- or competency-based training is important for focusing training on the skills that employers need in their work force; however, the best-designed competency-based training system is only as good as the methods of measuring the quality of that training. The State Department of Education must see that the measurement system is uniform throughout the state.

Funding

Program Funding

Goal:

State funding of technical education should provide incentives for community colleges and AVTS to supply programs needed by employers and students throughout their service areas.

Policy options:

1. Provide incentives for community colleges to offer technical programs by basing state aid for technical programs upon relative costs.

Rationale: Highly technical programs, such as nursing and biomedical technology, cost much more per credit hour than other programs, such as accounting and business administration; therefore, colleges gain more financially by offering lower-cost programs even though the expensive programs contribute significantly more to the economic development of the region and state. By funding programs on a continuum defined by relative cost, colleges would have more incentive to offer the costly, highly-technical programs that could have a significant impact on regional economies.

Equipment Funding

Goal:

Funding for equipment at community colleges' and AVTS' technical programs should be at a level to insure that training occurs on equipment comparable to that used or soon to be used by companies in their service area.

Policy options:

1. Provide state equipment funds consistently and at levels that insure program viability at AVTS, and extend equipment funds to cover community colleges' vocational-technical programs.

Rationale: Businesses report that AVTS and community colleges must have the most technically-advanced equipment for training; however, capital outlay funds that support instructional equipment at AVTS have been appropriated for only three of the past eight fiscal years, and community colleges currently receive no state funding at all for equipment. Funds should be allocated yearly so that AVTS can plan for and meet their programs' equipment needs, and state funding should be extended for community college vocational programs.

Customized Training

Goal:

Employers should have access to training customized to their needs both for new employees and for the retraining of current employees.

Policy options:

1. Provide state support for a workforce training coordinator at each community college and AVTS to market and coordinate customized training in a service area.

Rationale: Businesses report that customized training is more cost effective that other forms of training. Vocational-education institutions need a person who is dedicated to marketing customized training to contact businesses, assess training needs, prepare contracts, and help ensure that training meets the client's needs.

2. Establish a two-year pilot program to encourage small companies to participate in customized training.

Rationale: Small businesses must have access to training for their work force if they are to remain competitive. A small business does not usually have enough employees to justify a course to meet its needs; therefore, vocational-education institutions need to assess and coordinate the training requirements of small businesses in their region in order to meet and identify overlapping needs. Ensuring that small companies participate in customized training should be an important part of the work-force training coordinator suggested in the previous policy option.

System Coordination

Coordination of Technical Education Programs Across Training Institutions and Across State Agencies

Goal:

A well-coordinated training system should minimize duplication of training and ensure that state objectives are met so that technical students and employees can progress through multiple levels of training and receive recognition for previous skills attained.

Policy options:

1. Coordinate secondary with postsecondary technical programs and the Regents' institutions so that students trained at both levels receive credit or advanced placement.

Rationale: A well-coordinated technical training system should encourage people to enter and leave the system as appropriate to their individual needs with minimal duplication of material taught. The expanding need for technologists requires that advanced training be available as the necessity for life-long training increases. The technical training system must take advantage of Regents' institutions to provide access to more technical training, and it must ensure that students receive credit or advanced placement for previous training at community colleges.

2. Require articulation agreements between all community colleges and AVTS for postsecondary students in a service area and establish joint regional planning to reduce the number of duplicated programs and upgrade the level of remaining programs.

Rationale: To improve coordination at the postsecondary level, reduce duplication, and lessen the cost of the system, community colleges and AVTS should act as part of one well-integrated system by planning regionally and entering into articulation agreements. Planning should be based upon knowledge of current and expected needs of the population and of business in the service region.

3. The staff of the current Kansas Industrial Training/Kansas Industrial Retraining (KIT/KIR) Training Program should be expanded and renamed the Office of Work Force Training. Reporting to the Kansas Secretary of Commerce, the new office should coordinate the efforts of the Kansas Departments of Human Resources, Commerce, and Social and Rehabilitation Services and be the primary clearinghouse for firms with work-force training needs.

Rationale: Because work-force training issues go beyond industrial recruitment but are critical to retention and growth of all businesses, the new office should report directly to the Secretary of Commerce. A sufficiently-staffed office dedicated to work-force training in the Department of Commerce could act as a clearing-house for "one-stop shopping" for businesses seeking information regarding training resources in the state.

4. Develop a common set of intake and assessment methods for use by all agencies in the state employment and training system.

Rationale: By developing a common set of intake and assessment methods for training and employment, agencies would allow clients to move across agencies with little or no repetition of testing or data collection.

Business Role

Innovative Technical Programs

Goal:

Facilitate the development of innovative technical programs or courses that address skill shortages in the Kansas labor market.

Policy options:

1. Establish a Kansas Skills Program to provide start-up support for innovative technical courses or programs in emerging technologies and manufacturing, or in areas of skill shortages, with business providing in-kind support.

Rationale: Vocational-education institutions cite lack of start-up funds as a major barrier to program development: schools cannot receive state support for a program until after the completion of the first term; therefore, schools must divert funds from existing programs to fund new programs. By combining the current practice of recruiting industry support for new programs with the use of state seed money, programs that have important economic impact, such as manufacturing-related programs, would have a better chance of being developed and implemented.

Faculty/Staff Development

Goal:

Faculty in vocational programs should have opportunities to upgrade their technical skills and knowledge of business practices on a regular basis.

Policy options:

1. The State Department of Education should assess current opportunities and requirements for faculty and career counselor development at all community colleges and AVTS and set guidelines for such development.

Rationale: Retraining and upgrading of instructors' and counselors' skills is a voluntary activity at most vocational-education institutions; few offer sabbatical leaves for faculty to upgrade their skills, and there is very little funding support for faculty development. Some faculty work in industry during the summer, and this link is critical and should be encouraged.

2. Some percentage, e.g. 2 percent, of each AVTS' and community college's instructional budget should be set aside to develop and fund programs for faculty development; these funds should be matched by state and business contributions.

Rationale: Because upgrading faculty skills is so critical to the quality of training delivered, schools must make a significant effort to support faculty development. Business contributions could provide faculty with opportunities to train on new equipment or provide other industry-specific experiences that would broaden faculty knowledge and understanding of changes occurring in industry.

3. Use state funds to encourage technology and knowledge transfer from educational institutions to business and industry, and vice versa, through exchange programs.

Rationale: Technology and knowledge are shared when faculty interact with industry, whether through faculty work in industry or industry employees working in educational settings. Programs that encourage utilization of industry experts in education, especially in teaching, should be encouraged.

Job Training Partnership Act (JTPA)

Goal:

Programs funded through the Job Training Partnership Act should be an integral part of the state's economic development program. In particular, the JTPA can expand the supply of labor by preparing disadvantaged persons for meaningful employment through technical training.

Policy options:

1. Coordinate on-the-job-training (OJT) contracts with customized training contracts funded by KIT.

Rationale: The JTPA can subsidize a client's salary by 50 percent for up to six months of training, an especially powerful incentive to new businesses which do not have a large human resource pool and are unfamiliar with Kansas labor-market trends. Also, expanding businesses that prefer to do inhouse training will find it economical to use JTPA funds.

2. JTPA services should target development of technical job skill and basic academic skill competencies to prepare people for meaningful employment.

Rationale: Meaningful employment results in economic self-sufficiency. Rather than offering remedial education with no guarantee of job placement, the JTPA should focus on developing competencies so that employers are assured of a labor force with educational and vocational skills sufficient for today's jobs.

3. JTPA coordination with community colleges and AVTS should be increased to insure that JTPA clients can advance to higher-level training programs.

Rationale: The purpose of the JTPA is to meet the training needs of the disadvantaged. There are two populations of consequence: those who have not received remedial education, and those who have not received occupational or professional education. By using community colleges and AVTS, the needs of these disadvantaged populations can be met.

Planning for Training Programs

Goal:

Strengthen strategic planning for vocational education at the state and local levels to better anticipate and meet the needs of students and the business community and anticipate industry changes.

Policy options:

1. The State Department of Education's strategic plan for vocational-technical education should identify changing needs for skill training and anticipate and respond to population and industry changes so that both the regional and statewide needs are met.

Rationale: The State Department of Education must create an awareness of the business and employment trends in Kansas and the world economy. The Department should draw upon state, national, and global research data to identify demographic changes and emerging or changing occupations and to target businesses and industries that are undergoing rapid changes in technology, and use this information to modify the training system.

The state should also develop a plan to cope with the decreasing population in rural areas so that the system can continue to provide adequate services. Planning efforts should also explore alternatives to make rural-based vocational education accessible and cost-effective.

Business Commitment and Partnership

Goal:

Increase business-industry commitment and partnership in postsecondary technical education in Kansas to ensure that the system is market driven and responsive to work-force training needs.

Policy options:

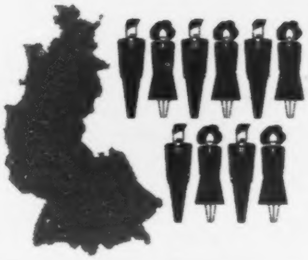
1. Businesses could play a substantial role in upgrading technical education by serving on high-level advisory commmittees, guiding the development of competencies, assisting with equipment decisions and acquisition, facilitating faculty development, helping with program design and evaluation, and keeping vocational-education institutions informed of anticipated labor-force expansion and skill changes.

Rationale: Each educational institution should include owners, CEOs, and top management-level people from key industries in its region, in the school's strategic planning advisory group. By participating in funding decisions and sharing their ideas of human resource needs, business advisors can help the institution to provide an adequately-trained work force for current and anticipated needs of regional business and industry.

Notes

1. *Work Force Training: the Challenge for Kansas*, Report No. 168. Lawrence, Kansas: University of Kansas, Institute for Public Policy and Business Research, 1989.

Work-Force Preparation: West Germany's Approach to Training



Brian Bosworth

Brian Bosworth is a consultant in economic development in New York state.

The character of U.S. industry is changing and the assembly line, with its rows of semi-skilled workers doing the same work all the time, is becoming obsolete. New types of jobs will require new skills, and the incumbent labor force, getting older, will have to become both multiskilled and adaptive as the supply of new, young workers declines. Industry's tendency to recruit younger people in order to sustain productivity growth will have to change to the retraining of the older work force.

Kansas is no different from the rest of the United States. Last winter one of Wichita's aircraft manufacturers held a job fair in an effort to fill about 200 positions: although hundreds of applicants attended the fair, few of them were qualified for the jobs.[1] In 1989 the Institute for Public Policy and Business Research at the University of Kansas surveyed 618 Kansas businesses in order to discover employers' views on the current vocational and technical training system and their opinion on work force training needs: more than three-quarters of the firms reported that new employees lacked not only verbal, math, and technical skills but also the skills necessary to reason and solve problems.[2] According to the study, 65 percent of the firms surveyed said that their employees would need to improve their technical skills considerably over the next five years in order to keep up with job requirements.

Some countries in Europe and the east are often cited as having employees better trained than the labor force of the United States--Japan, in fact, spends twice as much in on-the-job training than this nation. Those countries which make the most use of their human resources usually have developed a national program. One of these countries is the Federal Republic of Germany. An examination of the Federal Republic's vocational preparation system demonstrates one way in which a well-trained work force, one that can switch easily from one job to another, can be attained.

The General Education Foundation

In the Federal Republic of Germany, compulsory education begins with primary school at the age of six for all children; in most of the federal states nine years of full-time attendance in school is required. In addition, federal law requires an additional three years of at least part-time attendance in vocational schools; therefore, a young person is required to be in school or in a government-sanctioned apprenticeship training program which involves a part-time school, until the age of 18.

Primary school generally lasts for four years; half the program is devoted to German language studies and to mathematics. At about age 10, students advance to one of three tracks of general secondary school--the main school, the intermediate middle school, or the academic secondary school. Normally, these tracks are in separate institutions. Admission to the main school is automatic for all primary school completers, but admission to the intermediate and the academic schools involves a selection process which may consist of an examination or merely the recommendation of the primary school.

Generally, students with the best record of achievement go to the academic secondary school as it is the most rigorous of the three. It requires nine years to complete and typically includes two foreign languages as well as extensive math and science courses. Graduates of the academic schools earn a place in a university, but some students first attend specialized technical or vocational schools and others enter an apprenticeship training program in West Germany's "dual" system.

Intermediate school students receive a level of instruction between the main and the academic middle school. Many graduates of the intermediate school advance to special technical or vocational schools and some advance to the academic track, but most go into the "dual" system of apprenticeship training.

The main school, the least demanding of the three options, is completed in six years. The academic program covers a broad range of subjects including mathematics, biology, chemistry, physics, and computer science. All students take English. Most main school graduates enter the apprenticeship training program in the "dual" system.

Vocational Training in the Dual System

Overall, about 70 percent of each group of school completers moves into the dual system of vocational preparation, about 20 percent complete the rigorous path of university education, and the other 10 percent fall through the cracks in the system, although one-half of those are now enrolled in second chance programs. The dual system is so named because it includes both workplace training provided by employers and school-place training provided by public authorities. The apprentices are paid a wage while they learn a trade.

The Training Agreement

There are presently some 380 trades officially sanctioned for training under the dual system. The training period is covered by a formal contract between the apprentice and the employer and normally lasts for two to three and one-half years. The training contract is not an employment agreement--neither the firm nor the apprentice make an employment commitment--but it provides for a training plan which is tightly regulated and uniform across the nation.

For each trade, national training regulations spell out in great detail the precise minimum skill proficiencies that are required for successful completion of the apprenticeship period, and they also specify the sequence in which those proficiencies are to be gained. A rigorous examination is required. As a consequence, all employers know what skills a job applicant will possess even when trained by another firm. All applicants have an assurance that any firm to which they are apprenticed will be required to train them to the same minimum level of proficiency.

The Training Regulations

The training regulations are developed at the federal government level through a highly structured process which demands agreement among employers (through their trade and industry associations), workers (through their unions), and the government.

Vocational Counseling

Because the choice of apprenticeship is so important to a person's future, extensive vocational guidance is provided to all students. All students in the main school receive in their last two years a course providing work experience and an introduction to the working world. This course seeks to help the student understand the requirements and benefits of employment and includes visits to several different kinds of firms and courses dealing with traditional crafts, business, and industry.

Career choice for all young people is assisted by a federal institute of labor or employment service. Vocational counselors are not employed by the schools; instead, they are employees of the federal institute located in 146 employment offices with 483 branch offices across the country. There are over 2,500 vocational advisors or counselors employed by the federal institute, and these counselors visit the schools for orientation programs, operate career information centers, have personal interviews with prospective apprentices, and arrange apprenticeship placements.

The Structure of the Training Program

The apprentice normally spends three to four days each week on the job, overseen by company instructors who are skilled craftsmen in the trade being studied. The apprentice attends a part-time vocational school operated by the state government for one or two days each week and receives both general education studies and courses providing a theoretical complement to the hands-on training received on the job. About 40 percent of the part-time vocational school program is general education and about 60 percent is work related. There are about 1,500 of these part-time schools in Germany and, in 1985, they cost about $1.6 billion to operate.

In recent years, between 80,000 and 100,000 apprentices have dropped out of their particular program; however, 50 percent of the dropouts have started on a new trade course and most of the rest have entered full-time vocational schools.

The Role of the Private Firm

Firms are not compelled to provide apprenticeship training but, if they choose to do so, they must be certified as competent by the local chamber of crafts, of industry and commerce, or of agriculture. Among traditional craft firms, just over 50% of the employers are training firms; among industrial firms the figure is about one-third, and just a small fraction of commercial or service employers are training firms. Over 60 percent of all trainees are in firms of less than 50 employees.

Many of these small firms cannot afford to operate training programs on an independent basis, nor can they provide the range of foundation preparation or skill development that is demanded by the training regulations. These firms have banded together with some government assistance to establish "inter-firm training centers." There are now over 600 such inter-firm training centers in Germany.

Financing the System

All in-plant training costs are borne by the employer; no governmental subsidy is offered. The apprentice is paid a monthly salary which presently averages about $450 per month but which is as much as $600 per month in some of the trades in which a significant shortage exists. The training firm is also obliged to pay the fringe benefit costs associated with these wages. The training wages are uniform within each trade throughout the nation and represent between 20 and 40 percent of the starting wages for a skilled worker.

It is estimated that the net three-year cost of training for each industry and trade apprentice (total training costs including wage minus total value for work contributed by the apprentice) now amounts to about $25,000. For apprentices in the traditional crafts, estimates are about half that level, because the apprentice contributes more productive labor to the employer. In some large industrial firms, gross costs per apprentice can amount to as much as $75,000 over a three and one-half year period. In 1985, the net cost of in-plant vocational training for the whole system was estimated at about $12 billion, or an annual cost of about $6,500 per apprentice.

Summary

Over 70 percent of the young people in the Federal Republic of Germany prepare for work through the dual system of apprenticeship training and become skilled workers; just over 20 percent complete the rigorous path of university education. Only about 10 percent of any age group fall through the cracks in the system, and one-half of those enroll in second-chance programs.

This brief examination of the German Federal Republic vocational education system produces seven useful points:

1. School and work are integrated.

2. Everyone knows the rules. Workers and employers know precisely what skills are required for each certificate, and these certificates are transferable throughout the nation (and increasingly throughout Europe). The resultant "marketplace of qualifications" gives workers the mobility to change employment and employers the confidence to hire them.

3. Employers collectively train new workers and do it with their own money. Many firms train more workers than they intend to hire because they see themselves contributing to a national bank of skilled workers from which they will all make withdrawals.

4. Workers, employers, and the government are equally involved in designing, providing, and evaluating initial work preparation, job placement, and continued learning.

5. Students get help to make career choices.

6. Workers learn to be flexible.

7. People get second chances.

Conclusion

Because this particular system of vocational education is deeply embedded in the culture, history, and specific economic mix of Germany, it would be difficult to transport it as is to this country; however, if four key principles were followed, vocational education could be adapted to the needs of the United States in general and to Kansas in particular:

1. With the use of workplace-based training worker preparation could be shifted from the school to the work place.

2. A new partnership among employers, educators, and workers could result in a national agreement on uniform standards of worker proficiency. Ann McLaughlin, Secretary of Labor in the Reagan Administration, suggests the development of national achievement tests that students could voluntarily take to demonstrate proficiency in a variety of academic and vocational subjects. Such a test would give employers a standard by which to judge job applicants.[3]

3. Employers would have to be willing to take on the responsibility for the cost of training if they expect to be competitive in the world economy.

4. The challenge is to produce a highly-skilled work force that can work for, and be hired by, employers with confidence.

Kansas has become very aware of the need for a trained, skilled work force and is searching for ways to improve the methods and availability of the needed training; Kansas Industrial Training, for instance, is cooperating with the Kansas Department of Commerce and state educational institutions to fund skilled training costs.[4] Workers must possess high-level thinking skills and be able to reason, solve problems, and work cooperatively in order to meet the needs of globally-integrated production and marketing; a new approach to education would provide that work force.

Notes

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3. Ann McLaughlin, "Education and Work: the Missing Link," *The New York Times*, September 25, 1989.

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The Kansas Economy Past and Future: The 1980s and Beyond

Robert Glass

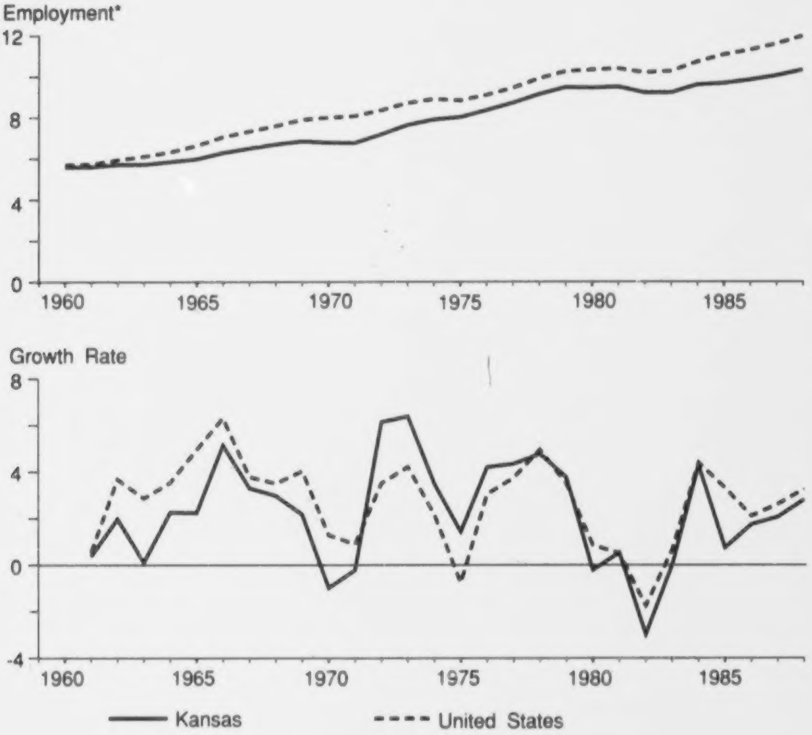
Robert Glass is a research economist at the Institute for Public Policy and Business Research.

The decade of the 1980s proved to be an economically difficult period for Kansas, coming as it did after eight and a half years of nearly uninterrupted expansion in the 1970s. While the national economy suffered a recession in 1974 and 1975, the state's economy experienced only a mild recession during that period: then the 1980s came. What happened? Will the 1990s be a repeat of the previous decade?

This article is an attempt to answer these two important questions by reviewing the relative economic performance of Kansas during the 1980s while, at the same time, looking toward the future. It is designed to provide an analysis of how it performed rather than why it performed as it did and will delineate some of the challenges which are to come for the economy without being a forecast of the future state of the economy.

The focus of this article will primarily be on economic growth, and in particular on relative performance compared to the nation and surrounding states. It will pay particular attention to the non-agricultural aspects of the Kansas economy, although there will be some examination of Kansas agriculture. The reason for the non-farm focus is that agriculture is not expected to be a growth sector in the future, and although agriculture will be

Figure 1
Non-Farm Wage and Salary Employment for Kansas and the U.S.



*U.S. employment in 10 millions; Kansas employment in 100 thousands.

important to the Kansas economy it will not provide more and better-paying jobs. We must look to the non-agricultural segment of the state's economy for such growth.

The two themes described above--past performance and future challenge--provide the structure for this article. The first three sections explore the state's past economic performance, with the emphasis on Kansas' economic performance in the 1980s relative to the nation and a comparison between Kansas and the economies of the surrounding states: Colorado, Missouri, Nebraska, and Oklahoma; the last two sections will look to the future and to what will probably be necessary for sustained economic growth throughout the 1990s. In particular, this review of Kansas' previous economic achievements will provide a viewpoint from which the major challenges that Kansans will face in the future can be established.

The Kansas Economy Since 1960

The economic history of Kansas naturally divides itself into three periods. Figure 1 illustrates these three periods using non-farm wage and salary employment data for Kansas and the U.S.[1] From 1960 through 1971 the Kansas economy consistently grew at a slower pace than the national economy. This period climaxes with the 1970-71 recession brought on in part by the winding down of procurement for the Vietnam War. Because Kansas is one of the states which receives a relatively large share of the defense budget, the end of the Vietnam War hit Kansas hard, particularly in Wichita.

The next period, 1971 to 1980, was a period of sustained growth during which Kansas consistently grew faster than the national economy, as illustrated in Figure 1. This growth can be traced to three major industries in Kansas: aircraft, agriculture, and oil production and refining. Employment in the Wichita aircraft industry, which had reached a disastrous low in 1971, more than doubled between 1971 and 1980. Agriculture also thrived in that period, particularly in 1972 and 1973, due to the large Russian wheat orders. The oil industry flourished in the middle and late 1970s and the Kansas economy benefitted from the sharp increase in oil prices.

During the 1980s Kansas returned to the sluggish growth pattern it displayed during the 1960s. Figure 1 illustrates how the gap between the U.S. and Kansas economies widened during the 1980s, as it had during the 1960s.

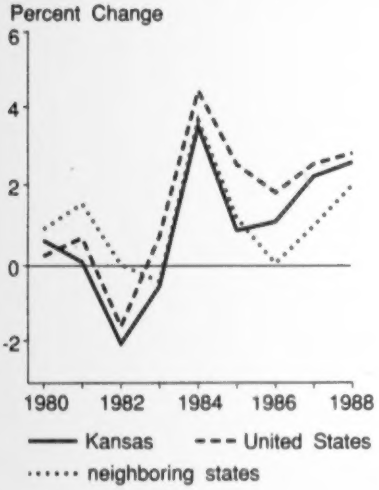
One lesson that can be learned from this quick review of Kansas economic history since 1960 is that even though Kansas grew at a slower rate than the U.S. during the 1960s and 1980s, the 1970s demonstrate that Kansas need not always have slower growth than the nation.

The Kansas Economy in the 1980s

This section contains a more detailed examination of the Kansas economy in the 1980s, and a comparison between the state's economy and the behavior of the economies of the surrounding states. Besides non-farm wage and salary employment, personal income and gross state product will be used as a basis for comparison.[2]

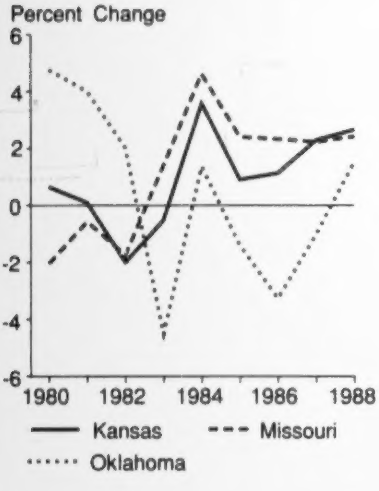
The short 1980 and much deeper 1981-82 recessions merged into one recession in Kansas. The nation pulled out of the second recession in November 1982 while Kansas pulled out of the recession around March 1983. The relative depth of the recession in the non-farm sectors in Kansas can be seen from Figure 2.[3] For example, employment in the Kansas manufacturing sector fell about 25 percent from March 1980 to March 1983. Figure 2 also provides a comparison with Kansas and the four neighboring states. Again, during the com-

Figure 2
Non-Farm Wage and Salary Employment Growth in Kansas, Neighboring States and the U.S.



bined period of the two recessions, Kansas was hit much harder than the average of the neighboring states. Figures 3 and 3a provide an individual comparison with each of the four surrounding states; only the Oklahoma economy was noticeably harder hit during the two recessions than the Kansas economy, probably due to the plunge in oil prices from their peak in early 1980.

Figure 3
Non-Farm Wage and Salary Employment Growth in Kansas, Missouri and Oklahoma



After the recessions during the early 1980s, the Kansas economy recovered and experienced employment growth for the rest of the decade;[4] however, growth in Kansas non-farm wage and salary employment still lagged behind the U.S. and the neighboring states until 1986, as Figure 2 illustrates. Since 1986, Kansas employment has grown faster than the average of the neighboring states and has narrowed the gap with the U.S. growth rate. Figure 3 and 3a show that since 1984, Kansas employment has grown faster than employment in either Colorado or Oklahoma, and has done at least as well as Nebraska. By 1988, Kansas had caught up with Missouri's employment growth rate.

The impact of the national recessions in the early 1980s is magnified by looking at personal income data. Figure 4 shows the huge drop in the growth rate of personal income in the U.S., the four surrounding states, and Kansas, from 1980 to 1983; however, personal income is not deflated. The drop in personal income growth rates is the result of both the decline in the real economy and the reduction in the inflation rate. Both phenomena occurred simultaneously in the early 1980s.

After 1984, the Kansas economy does relatively worse if personal income data (Figure 4) is used instead of employment data (Figure 2) as the measure of performance, because of the drag farm income places on Kansas personal income. This is particularly evident in 1988, due to the drought. A consequence of Kansas' relatively weaker performance is that the gap between U.S. and Kansas personal income growth rates widened after 1984, while employment growth rates were narrowing. A second consequence of the weak performance is that Kansas personal income growth rates after 1984 mirror the sluggish growth rates of the neighboring states.

Using gross state product rather than personal income as a measure of economic performance provides a different dimension of the 1980s for two reasons. First, gross state product is deflated, which means that the inflationary period of the early 1980s emerges in a different light from that provided by personal income. A comparison of the period 1980 to 1983 in Figure 4 and Figure 5 illustrates the impact of inflation during that period. For example, without deflating, the trough in the second recession

Figure 3a
Non-Farm Wage and Salary Employment Growth in Kansas, Colorado and Nebraska

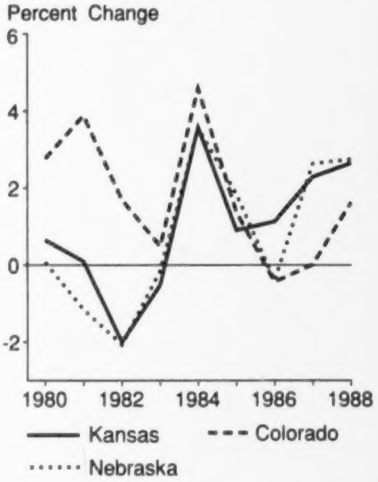


Figure 4
Personal Income Growth in Kansas, Neighboring States and the U.S.

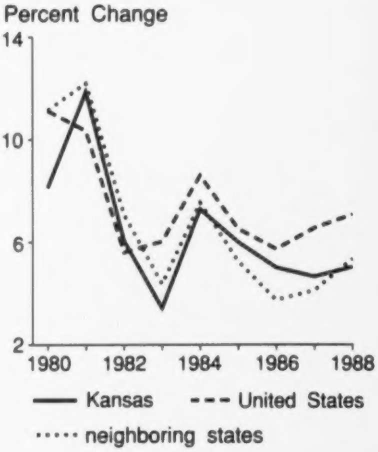
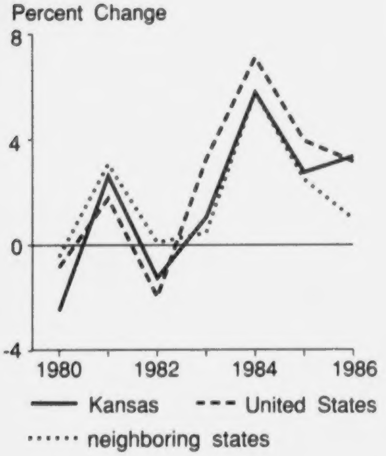


Figure 5
Gross State Product of Kansas, Neighboring States and the U.S.



appears to be in 1983 (Figure 4); however, when the data are deflated (Figure 5) the trough is obviously in 1982. Second, gross state product is a measure of output while personal income is a measure of income generated. The area most affected by these different types of measurement is the farm sector; at times, the transfer payments to farmers significantly alter the relative performance of some states' farm sectors. The transfer payments count as income but not as output. The pattern that emerges from the deflated output data is one of sluggish recovery and performance from 1982 onwards, relative to the nation; but the data does contain an indication of improved performance, commencing in 1986.

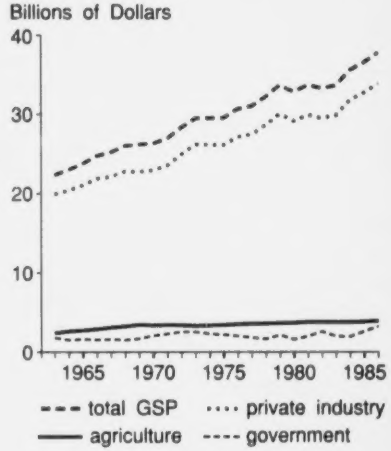
In summary, the data suggests that the Kansas economy was outperformed by the U.S. economy throughout the 1980s. During the first part of the decade the Kansas economy was particularly hard hit by the recessions and was outperformed by most of the surrounding states: certainly by the average of the surrounding states. Since 1986, however, the Kansas growth rate has converged toward the U.S. growth rate, and the Kansas economy has grown faster than an average of the surrounding states.

This review of Kansas' economic performance in the 1980s suggests two questions: what were the sources of decline in the Kansas economy, and what were the sources of growth over that period?

Sources of Decline and Growth

This section contains a progressively more detailed review of the Kansas economy in order to identify the sources of its decline and growth. Moving from the aggregate Kansas economy, different industrial sectors will be examined to determine their relative growth performance. Different geographical regions within Kansas will also be examined in order to see how growth is spread throughout the state.

Figure 6
Kansas Gross State Product



Industrial Sectors

Historically, the private non-farm segment of the Kansas economy has contributed the most to economic growth. Figure 6 provides a long-run representation of the growth paths of the broad sectoral categories of the state's economy. During the early 1970s, under the Nixon administration, the government sector in Kansas grew beyond its trend for a few years, but over the range of years included in Figure 6, the private non-farm portion of the economy was clearly the engine of growth.[5]

Kansas gross state product is broken down by its ten major sectors in Table 1. This table contains the annualized growth rates for the ten sectors during the 1980s. The third column of the table gives an indication of how growth in the major industrial sectors in Kansas compares to the national growth trends. Only three sectors in Kansas performed better than the national growth trend for their sector: agriculture, manufacturing nondurable goods, and transportation, communication, and public utilities. The sector which performed the worst relative to the national growth trends was mining; given the sharp decline in oil prices during the early part of the decade and the maturity of the oil industry in Kansas this is not surprising.

Table 1
Gross State Product and Gross National Product (annualized percent change, 1980-1986)

	Kansas	U.S.	Difference
Total	2.33	2.80	-0.47
Agriculture, Forest & Fish	11.92	4.60	7.32
Mining	-8.26	-2.31	-5.96
Construction	-2.09	0.67	-2.75
Manufacturing	3.12	3.32	-0.20
Durable Goods	3.81	4.24	-0.43
Nondurable Goods	2.17	1.83	0.34
Trans., Comm. & Pub. Util.	2.00	1.18	0.13
Wholesale & Retail Trade	2.72	4.22	-1.50
FIRE*	2.00	2.86	-0.86
Services	2.51	4.07	-1.56

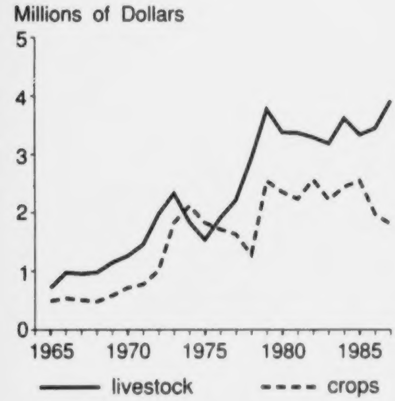
*FIRE stands for finance, insurance and Real Estate.

Table 2
Employment Growth in Kansas, 1980 to 1988

Industry	% Change
All industries	8.58
Services	21.43
FIRE	18.76
Retail Trade	15.16
Government	9.03
Wholesale Trade	4.71
Trans., Comm., & Public Utilities	1.09
Manufacturing	-5.02
Construction	-10.19
Mining	-53.33
Farm Employment	-25.13

A similar type of sectoral breakdown appears in Table 2, but this time employment is used to measure economic performance; rather than an annualized growth rate, the total percentage change from 1980 to 1988 is used. Table 2 indicates that the Kansas employment growth during the 1980s came from the service oriented industries instead of from the traditional sectors. The agricultural sector, which performed better than any other sector when measured by output (Table 1), actually lost more than 25 percent of its employment during the 1980s. This is not an indictment of Kansas agriculture but rather a reflection of the successful increase in labor productivity in agriculture and of other underlying changes in this sector. For example, except for the period after the Russian wheat deals of the early 1970s, livestock has generated more cash than crops have in the agricultural sector (Figure 7)[6]. If data for 1988 and 1989 were available they would probably show that the increasing spread since 1985 between the cash generated by livestock and the cash generated by crops would be continuing, due to the drought. Another recent development has been the increased importance of government payments as a source of cash to farmers; in 1987 cash government payments had risen to about 15 percent of total cash receipts.

Figure 7
Farm Cash Receipts



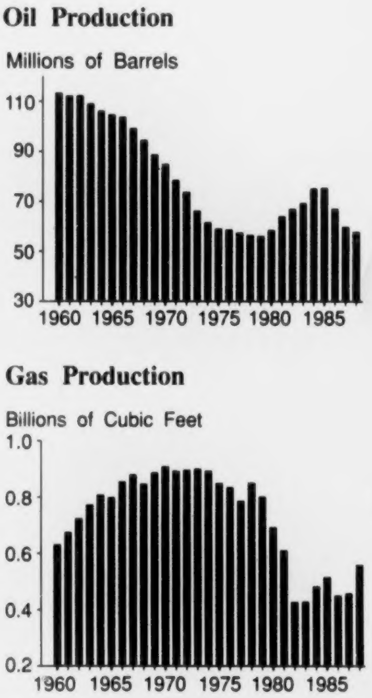
The Kansas mining industry is dominated by oil and natural gas production. Even with the two price shocks of the 1970s, oil production did not return to its 1960s level and, since 1985, it has steadily declined (Figure 8). Natural gas production increased inconsistently after 1981 following a sharp drop in 1978-1981 (Figure 8). The future prospects for the natural gas industry in Kansas look brighter than for the oil industry, but neither of them is likely to generate a significant growth in employment as they did in the 1970s after the oil embargo.

The Wichita aircraft industry, during the post-World War II era, had been the dominant manufacturing industry in Kansas; however, the 1980s was a bad decade for the general aviation industry. Figure 9 shows the declining aircraft production in the 1980s; Figure 10 illustrates U.S. aviation billings for the same period, and McDougall and Cho suggest that Kansas manufacturers account for about 50 percent of these billings. The market has picked up for the past year or two, and the future is somewhat brighter, although the decline in the expected defense expenditures due to the end of the cold war could alter that projection.

Geographical Areas

One of the common features of industrialized life is the migration of population from rural to urban areas. In Kansas, this phenomenon has gradually created strips of economic growth and

Figure 8
Kansas Oil and Gas Production


Oil Production

Gas Production

Figure 9
U.S. Aviation Production

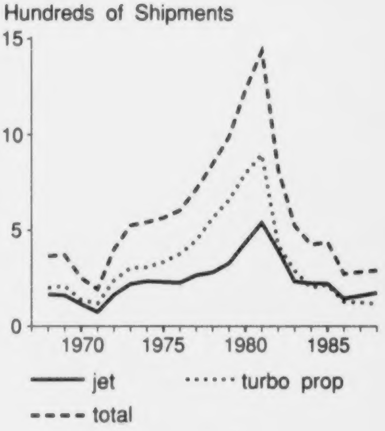
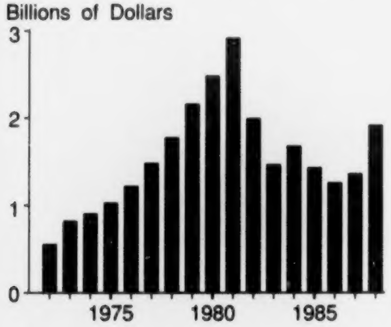


Figure 10
U.S. Aviation Billings

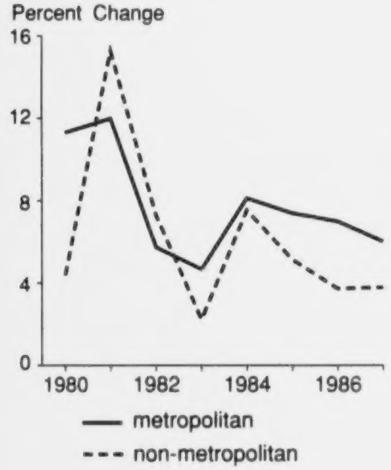


Note: Kansas manufacturers account for about 50% of the total.

Source: McDougall and Cho, *Kansas Business Review*, Fall 1989.

large regions of declining population with fewer job opportunities.[7] The 1980s represented a continuation of this trend. A comparison of personal income growth rates for the metropolitan and non-metropolitan areas of Kansas (Figure 11), indicates that except for unusually good years for agriculture, the metropolitan areas grew faster. Figure 12 illustrates that once Kansas had pulled out of the early 1980s recession and growth had returned to the state economy, nearly all of that growth took place in metropolitan areas. For example, 1985 and 1986 were years of economic growth for Kansas, yet employment declined in non-metropolitan areas.

Figure 11
Kansas Personal Income Growth



The fastest growing metropolitan county in Kansas over the past 30 years, by just about any measure that is used, is Johnson County. In the 1980s Johnson County's growth was led by the service industries. The service orientation of Johnson County's growth is consistent with the national trend toward an information and service economy and away from the traditional goods-producing economy; however, not all service industry growth can spur on an economy. For example, economic growth is difficult to foster with increased retail activity: increased retail activity is usually the result of economic growth, not the cause of it. In Johnson County many of the new service jobs could be a basis for economic growth rather than as a result of it (Table 3).[8] Table 3 also has a comparison between the growth rates for the U.S., Kansas, and Johnson County. Economic growth driven by service industries proved to be good for the Johnson County economy.

Unfortunately, the state as a whole is not in nearly the same position as Johnson County: notice in Table 3 that FIRE[9] and Services, the broadest categories of service industries, have grown meaningfully slower in Kansas than in the U.S. The state is not experiencing the same growth in these sectors that the U.S. is, even with Johnson County's impressive growth; not even Kansas' metropolitan areas are sharing in the good fortune. For example, from 1980 to 1986 the business services sector grew 173.2 percent in Johnson County, 52.8 percent in Shawnee County, 11.8 percent in Sedgwick County, and 54.2 percent in the U.S. The type of growth Johnson County has experienced needs to be fostered in the rest of Kansas.

Several conclusions emerge from this more detailed discussion of the Kansas economy. First, the sectors which provided the basis for economic growth in the 1970s--agriculture, oil and gas production, and aviation--do not seem to be the sectors which can lead Kansas in the future, although this does not mean that they are now unimportant--just a recognition that they are mature industries. Second, the example of Johnson County exemplifies the possibility that economic growth can be stimulated by other than the traditional growth sectors of the economy; however, for the state to fully benefit from the service sector growth, it needs to be fostered beyond the borders of Johnson County. Finally, rural Kansas will continue to face special problems in achieving economic growth in the future.

Some Considerations Underlying Future Economic Performance

This review of the past decade naturally leads to the question of what does the next decade and beyond hold for Kansas. Basically, three conditions need to be met before economic growth can take place: the resources necessary for production need to be available, the ability to use those resources needs to be available, and an environment which will allow the productivity use of the resources must exist. This statement is exceedingly general and abstract, but it does provide a simple structure which can be used to evaluate Kansas' economic prospects for the next decade.

The first condition for economic growth is the availability of the necessary resources. The Kansas economy had available to it the resources necessary for sustained growth in the 1970s. The

Figure 12
Kansas Non-Farm Employment Growth

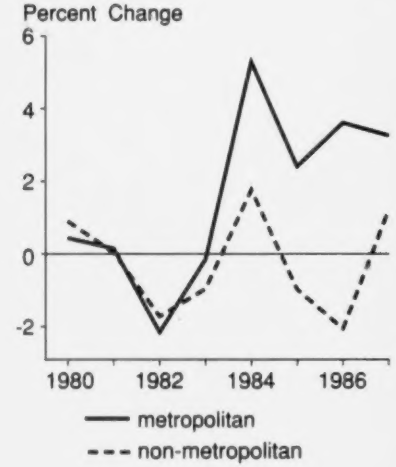


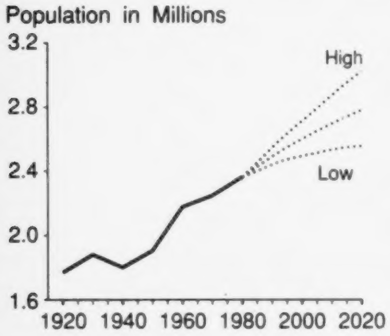
Table 3
Strong Growth Sectors, 1980-1986 (rate of growth)

	Johnson County	Kansas	U.S.
Total	41.0	5.6	11.4
Truck & Warehousing	45.3	-8.9	1.9
Communication	75.6	1.7	-3.8
Wholesale Trade	37.5	1.0	9.9
Retail Trade	35.5	9.2	16.6
FIRE	53.9	15.7	20.3
Services	92.9	25.0	33.1
Business Services	173.2	69.4	54.2
Health Services	62.1	7.6	25.8

important resources during that decade were raw materials, agricultural production, and manufacturing. As mentioned earlier in this article, the basis of growth in the U.S. economy has moved away from raw materials, unprocessed goods, and traditional manufacturing; the nation's economy is driven less by the production of goods and more by the provision of services and information.

As we move further into the information age, the size and quality of Kansas' labor force becomes much more critical. Figure 13 displays three possible projections of the population of the state to 2020. Even in the case of the lowest projected population growth, Kansas' population is still expected to grow, although at a much slower rate than it has in the past few decades. Figure 14 offers a comparison of recent and projected population growth rates for Kansas and the U.S.[10] Since the turn of the century, Kansas' population has grown at a slower rate than the population of the U.S. because of the farm displacement and net outmigration, a trend that is anticipated to continue unless economic growth is enhanced.

Figure 13
Population Growth in Kansas



Note: Dotted lines indicate projections.

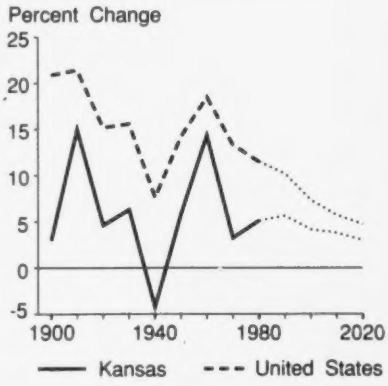
The 1990s will be dominated by the problems associated with the development of human resources, and changes in the composition and characteristics of the population will be at least as important as aggregate changes in the population.[11] One of the most important characteristics of a population from an economic standpoint is its age structure: Figure 15 furnishes age structure charts for Kansas in 1980 and the year 2000. The most conspicuous anticipated change in the age structure by the year 2000 is the moving of the baby boom bulge to the middle age bulge. The increase in the number of people over 35 years old will affect the nature of the demand for goods and services in the economy significantly. More importantly, an aging population means that retraining of a middle-aged and demographically diverse work force, rather than just training of new entrants, becomes the key factor in raising the quality of the labor force. The traditional education and training system is not oriented to this task.

One of the key strengths of the Kansas economy has been its productive work force; however, the possibility exists that this historical strength could become a critical weakness unless the changing needs of the labor market are recognized and met.

The second condition for economic growth is the ability to use the resources productively. This review of Kansas' economic performance in the 1990s indicates that the traditional Kansas sources of economic growth will not be able to induce future growth in the Kansas economy, but if economic growth is to accelerate in the 1990s, then it must almost certainly come from new sources; that is, Kansas must enhance its entrepreneurial ability.

Because of the abstractness and subjectiveness of the concept of entrepreneurship it is difficult to get an accurate measurement of the degree of its existence in an economy. One approach to investigating this phenomena is to look at new business formations. Figure 16 compares net business formations for Kansas, for the four neighboring states, and for the U.S., over the period 1980-1986; only Colorado has a significantly higher rate of net business formation, but the Kansas rate is almost identical to the U.S. rate. Figure 17 shows net business formation in Kansas over the same period by major industrial sector; the figures for agriculture and mining probably

Figure 14
Population Growth Rate in Kansas and the U.S.



Note: Dotted lines indicate projections.

do not mean a lot, but the figures for the other sectors suggest that the focus of Kansas entrepreneurship is in the service-industries portion of the economy. Figures 16 and 17 indicate that the entrepreneurial spirit is still alive in Kansas, and this will need to be fostered in the 1990s.

The third requirement for economic growth is an economic environment where entrepreneurship can work easily with the resources needed for production. In many cases a good economic environment for growth is a reduction of the role of government in the economy. The most compelling recent examples of this phenomenon are in Eastern Europe, where the citizens have recognized the negative role the government has played in the economy over the last few decades; however, the role of government in an economy should not be passive. When the benefits of particular actions are not completely reflected in the market place, or when market inefficiencies or imperfections exist[12], then the government can play an active positive role in the process of economic growth.

In response to the relative decline in the Kansas economy during the early 1980s, Kansans, in 1986, made a commitment to assist economic development in the state. Kansas has been a place where entrepreneurship has flourished; as a result, historically, most economic growth in the state has been of the home grown variety. The state economic development strategy continues this tradition by making a commitment to growth fostered by private initiative and private development. The role of government outlined in this strategy was that of making the Kansas economic environment one in which entrepreneurship could flourish. Economic development programs were established and by 1988 revenue from the state lottery became available for economic development programs. The economic development strategy created for the state was a long-run approach with the idea that the benefits would become obvious in the 1990s.

Given these considerations, the main challenges facing the state in the 1990s in its efforts to raise the level of economic growth to the national average or better appear to be:

1. Training the Kansas Labor Force for the 1990s

Better training for the Kansas labor force provides a payoff in at least three different ways. For workers to remain employable they are going to have to continue to upgrade their skills; for the businessperson, a better-trained labor force is necessary to compete in the global business world that is daily becoming more competitive; for Kansans, a better-trained labor force means the state is in a better position to attract new industry.

Figure 15
Age Structure of the Kansas Population

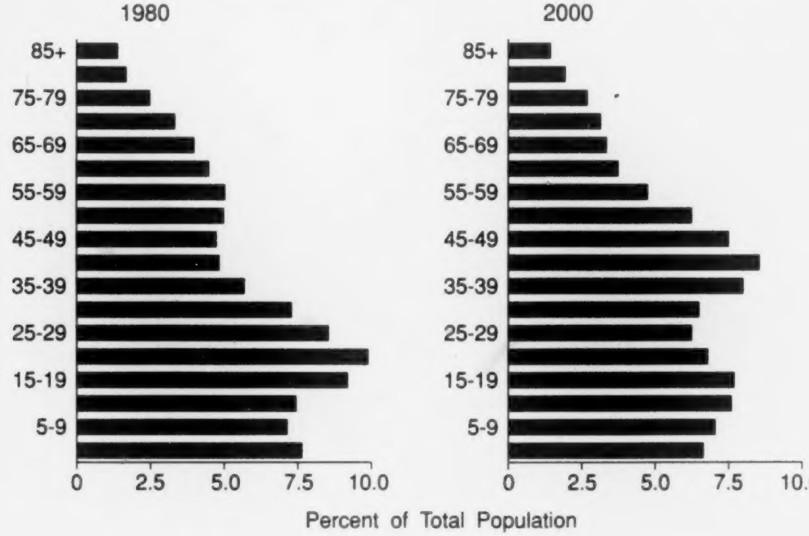
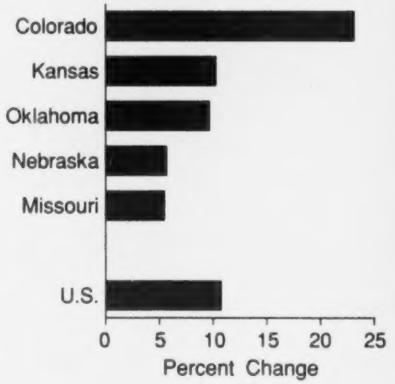


Figure 16
Net Business Formation in Kansas and Neighboring States, 1980-1986



2. Strengthening Entrepreneurship

Kansans need to ensure that the state remains an area where entrepreneurship can flourish; this means above all else having a labor force that is competitive, capital available for new, risky ventures, and providing a supportive environment for small business development.

3. Generate Advanced Technology-Driven Activity

Kansas has a strong university system with three major research institutions: Wichita State University, Kansas State University, and the University of Kansas. Mechanisms need to be developed whereby the research skills and activities at these institutions are accessible to the Kansas business community, both to enhance new high-technology start-up and support the competitiveness of existing Kansas industry.

4. Help Rural-Based Manufacturing Remain Competitive

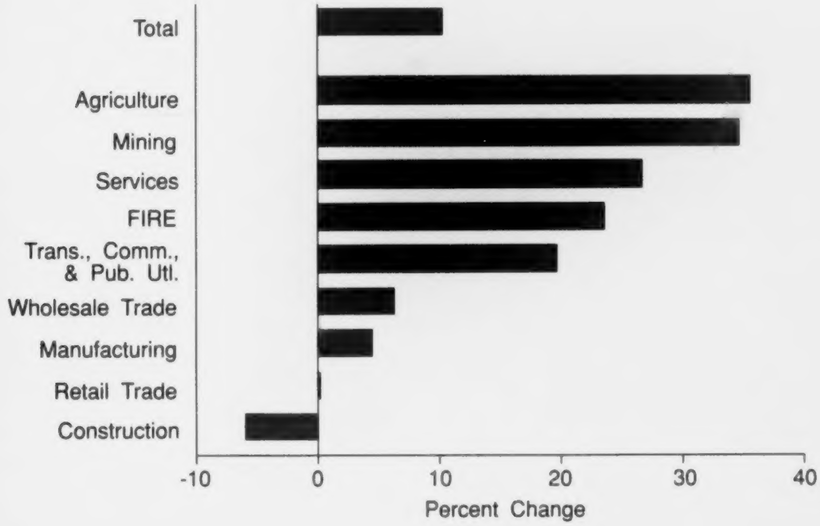
Employment growth in non-metropolitan Kansas has been stagnant throughout the 1980s; in order to keep smaller cities viable, the creation of new jobs is necessary. Because of the increased .global environment and rapid technological change, the small manufacturers throughout Kansas will survive and grow if they are innovative in production and globally oriented in marketing their products.

5. Development of Value-Added Agriculture

Just as it occurred with livestock, considerable job creation could occur in rural Kansas if value-added processing of agricultural crops is fostered in the state.

How Kansas meets these challenges in the years ahead will determine how the Kansas economy performs in the coming decade. The list of challenges could be extended, but these five provide an indication of the obstacles Kansas will face in the 1990s. The most important of these challenges is the training of the labor force: without a well-trained labor force, efforts to develop policy approaches to the other challenges will prove futile. Just having a well-trained labor force will not be sufficient, however: it must occur in a business climate of entrepreneurship and innovation.

Figure 17
Net Business Formation in Kansas, 1980-1986



Acknowledgement

The fundamental concept and guidance for this article was due to the efforts of Dr. Anthony Redwood, Executive Director, Institute for Public Policy and Business Research.

Notes

1. Non-farm wage and salary employment is the best indicator of the economic performance of the non-farm segment of the economy. Non-farm wage and salary employment refers to employment by place of work; as a result, people with two jobs are counted twice and people who work at home are not counted at all. Despite these problems, the figures are the most accurate employment data available. Throughout the rest of this article, the term employment will be used to cover non-farm wage and salary employment unless otherwise stated. In Figure 1, the U.S. figure is divided by 100 to put both Kansas and the U.S. on the same scale. This distorts the relationship between absolute changes in each economy, but it does provide a clear picture of the relative performance of each economy.

2. An advantage to using income and output measures for comparison is that these measures include the farm sector; however, each measure comes with a significant liability. A major flaw with the personal income data is the lack of an adequate index to deflate each state's personal income. National income deflators exist, but not for Kansas and the surrounding states: they do exist for two of the cities in the region, Kansas City and Denver. Because the inflation rate can vary throughout the region and because no reason exists to assume the national inflation rate is the same as the rate for Kansas, personal income must be deflated to give an accurate representation of the relative movements of state economies under inspection. With gross state product, the data are deflated; unfortunately, the last year for which data exist is 1986.

3. Figure 2 illustrates the percentage change in non-farm wage and salary employment from one year to the next, so the position of the graph in 1981 represents the growth rate from 1980 to 1981.

4. The employment data available from the Bureau of Economic Analysis only run through 1988.

5. This does not mean to imply that the government sector had no role in the growth of the Kansas economy; instead, it indicates that its role has been indirect rather than as an actual source of increased output.

6. The farm cash receipts data are not adjusted for inflation.

7. See Robert Glass, "Age Structure and Economic Growth in Kansas," *Kansas Business Review*, 6, no.2 (November-December 1982), 6-10.

8. For a detailed examination of the importance of the service sector in both the Johnson County and the Kansas economies, see Gina Sandborn, "The Importance of Service Firms for Kansas Exports," *Kansas Business Review*, 12, no.1 (Fall 1988), 1-10.

9. FIRE stands for Finance, Insurance, and Real Estate.

10. The middle population projection for Kansas from Figure 13 is used for the comparison with the U.S.

11. Anthony Redwood, "Human Resources Management in the 1990s," *Business Horizons*, 33, no.1 (January-February 1990), 74-80.

12. The classic example of this phenomenon is education--although everyone benefits from a better educated labor force, this benefit is not completely captured by the marketplace; therefore, governments have, in general, stepped in and made available for people the opportunity for more education than would be provided solely by the private market allocation of education.

Research Note

Experimental Disaggregated Forecasts of Kansas 1990 Growth Rates

David Burress,
with Pat Oslund,
David Rearden
and John Thissen

Dr. Burress is an assistant professor in the economics department at the University of Kansas and a research associate at the Institute for Public Policy and Business Research. Pat Oslund is a research associate, and David Rearden and John Thissen are research assistants at the Institute for Public Policy and Business Research.

Introduction

One limitation of the Kansas Econometric Model (KEM) is that distinctions between different business sectors can be drawn only at a fairly coarse level. In particular, KEM is able to forecast the Kansas economy as disaggregated only down to those 17 sectors for which time series data are available on a quarterly basis. This paper describes an experimental attempt to disaggregate the forecasts further, down to 48 sectors, by making use of additional input-output information available at the annual level from the Kansas Long Term Model (KLTM).

In fact, we will describe two different 48-sector forecasts of Kansas sectoral growth annual rates for 1989-1990. The first, our "Independent I-O Satellite[1] Forecast," used input-output multipliers based on KLTM so as to relate Kansas sectors directly to US forecasts from the Indiana-US model.[2] As such, this forecast was constructed completely independently from the Kansas-specific information used in the KEM forecast;[3] consequently, we were able to make a meaningful comparison between our forecast and the KEM forecast. That comparison revealed some substantial limitations in our strict input-output approach. Our second forecast, the "Disaggregated KEM Forecast" is an attempt to improve the first forecast by making full use of the KEM 17 sector Kansas information.

The Independent I-O Satellite Forecast

Our first forecast was based on a set of 1981 steady state multipliers for Kansas exports which were described in a previous issue of this journal.[4] We made the following assumptions:

1. The Kansas economy is completely driven by the (direct and multiplier) effects of its sales to other states and to the rest of the world, plus the effects of household consumption out of retirement income, dividends, and other outside or "exogenous" income sources.
2. Kansas interstate and foreign sales grow as a proportional share of US consumption in each sector. (This is a typical fixed market share, input-output type of assumption.) Kansas exogenous income is assumed to grow as a proportional share of US income of the same type.
3. US consumption by sectors can be predicted using 19 sectors from the Indiana US model; the detailed loadings we used are given in Table 1. (The loadings used in this experimental attempt are relatively crude. In particular, one single, relatively aggregated US sector is assumed to affect exports from any one Kansas sector. A useful improvement in future work would entail using a US input-output model so as to disaggregate the US sectors and create multiple loadings for each Kansas sector.)
4. Kansas can be described reasonably well in the past few years as following a steady state growth path; consequently, single year steady state multipliers can be used, and no time lags need to be introduced into the model.

We adjusted all of our multipliers and coefficients to agree with all available data for 1986 (the most recent year for which good data exist at the 48 sector level). Construction of the forecasts was then a straight forward exercise in matrix multiplication, multiplying our coefficients times the US Indiana forecasts for 1988 and 1989. Full details are given in the Appendix.

Table 2 shows the sectoral income growth rates forecast by this model, aggregated up to the 17 KEM sectors so they can be compared with the corresponding KEM forecasts. Table 3 shows the full 48 sector[5] forecasts from this model (as well as forecasts from the disaggregated KEM forecast which we describe below).

All growth rates are in nominal terms for 1989-1990. They could be translated into real terms by subtracting a forecasted inflation rate (around 4%, according to the Indiana-US model). Under standard input-output assumptions, the same rates of growth would be forecast for sectoral output as for income. All table entries are expressed as absolute annual rates of growth; for example, 5% nominal growth per year is expressed as .05.

Discussion of the Independent I-O Satellite Forecast

Three things seem noteworthy in the comparisons presented in Table 2. First, the overall level of growth rates in the independent input-output forecast is quite similar to that in the KEM forecast. (The average sectoral rates are about .052 and .057, respectively.) That result is encouraging: it implies that these two very different styles of satellite modeling, when applied to the same US model, lead to very similar implications for the macro-economic growth rate of the Kansas economy.[6]

Second, there is much less variation across the 17 sectors in the I-O forecasts

Table 1
Mapping from Indiana US Model to I-O Sectors

US Indicator (1989-1990 growth rate)	I-O Sector Driven
1. PCE: Motor Vehicles and Parts (0.025)	31. Motor Vehicles and Equipment
2. PCE: Furniture and Household Equip (0.052)	13. Lumber and Wood 14. Furniture and Fixtures 29. Elect. Equip. & Appl.
3. PCE: Other Durables (0.048)	15. Paper Products 16. Printing and Publishing 34. Scientific and Photographic Equipment 35. Misc. Manufacturing
4. PCE: Food (0.055)	10. Food Processing 11. Tobacco Processing
5. PCE: Clothing and Shoes (0.028)	12. Fabrics and Apparel
6. PCE: Fuel Oil and Coal (0.007)	6. Coal Mining
7. PCE: Other Nondurables (0.053)	17. Chemicals 18. Plastic Materials and Synthetics 19. Drugs and Preparations 20. Paints 22. Rubber, Rubber Products, Plastic Products 23. Leather and Leather Prod.
8. PCE: Electricity and Gas (0.101)	39. Electrical Services, Utilities
9. PCE: Other Services (0.090)	41. Finance and Insurance 42. Real Estate and Rental 43. Hotels, Personal Services 44. Eating & Drinking Places 45. Automobile Repair & Serv. 46. Amusements
10. Total PCE (0.070)	40. Wholesale and Retail
11. Federal Defense Expend on G&S (0.018)	32. Aircraft and Parts 33. Other Transportation Equip.
12. Federal Non-defense Expend on G&S (0.089)	48. Federal Government Enterprise
13. State and Local Government Expend (0.070)	47. Health, Education, and Social Services
14. Nonres Fixed Invest in Structures plus Res Invest (0.018)	9. Construction
15. Fixed Nonresidential Investment (0.081)	25. Iron, Steel, and Other Metal Products 26. Metal Products, Ordnance, Structural Metal 27. Engines and Machinery 28. Computers, Computing Equipment 30. Electronic Components and Parts
16. Net National Product (0.062)	5. Metal and Nonferrous Mineral Mining 8. Stone, Clay, and Gravel 24. Glass, Stone, and Clay Products 36. Transportation and Warehousing 37. Communication, except Radio and TV 38. Business Services, Radio and TV
17. Farm Proprietors' Income (0.076)	1. Livestock 2. Crops 3. Forestry, Commercial Fisheries 4. Agricultural Services
18. Price of Imported Oil (0.029)	7. Oil and Gas Extraction 21. Petroleum Refining
19. Federal Government Transfer Payments (0.091)	Exogenous consumption

than in the KEM forecasts. (The standard deviations of the sectoral growth rates are .013 and .034, respectively.) In technical terms, this result is predictable, because the I-O methodology leads to Kansas sectoral growth rates which are a weighted average of US sectoral growth rates (with a different set of weights in each sector). Consequently, the range of forecast growth rates across the 48 input-output sectors is interior to the range of forecast growth rates across the 19 sectors of the US model. In addition, the process of aggregating the 48 Kansas sectors to the 17 KEM sectors further homogenizes the growth rates. An additional problem is that the input-output approach contains rather limited information on any differences between Kansas and the US growth rates in any particular sector; whereas KEM contains Kansas-specific autoregressive and trend information which could, in principle, lead to wider forecast variations across Kansas sectors than across US sectors.

Third, and rather unfortunately, there is almost no specific resemblance between the I-O forecasts and the KEM forecasts at the detailed sectoral level. (Indeed, one possible measure of association, the correlation coefficient of growth rates across sectors, is -.037[7].) Unlike our I-O model, KEM is an established model, which has passed several tests of forecasting ability; consequently, it would be prudent to assume that KEM is more accurate than our original model, and that these discrepancies are largely explained by errors in our model.

The Disaggregated KEM Forecast

Next, we developed a revised method so as to address the two problems identified above in our I-O forecast (namely, probable inaccuracy and reduced variation across sectors). In particular, we added a final adjustment, in which the I-O sectors were forced to aggregate to the KEM forecast, by means of a proportionate adjustment. These results are exhibited in the last column of Table 3, referred to as the "Disaggregated KEM Forecast". The specific formulas we used are given in the Appendix.

Conclusion

Since the disaggregated KEM forecast uses all of the statistical information which is readily available to us, and since we have no previous track record of similar forecasts, we have no independent means for evaluating its predictive reliability. Future work might include tests of this forecast against future outcomes, or retrospective "postcast" tests of a similar model against historic outcomes; either approach would entail building up a substantial data base which is not currently available. At the present, we can only provide these experimental results as a potentially interesting but unverified exercise.

Table 2
Independent I-O Satellite Forecasts v. KEM Forecasts (nominal rates of income growth)

KEM Sector	Independent I-O Satellite	KEM	Difference
1 Agricultural Production	0.073	0.023	0.051
2 Agricultural Services	0.072	0.055	0.017
3 Mining	0.052	0.037	0.015
4 Construction	0.045	0.045	-0.000
5 Food and Kindred Products	0.054	0.061	-0.007
6 Apparel	0.039	0.059	-0.020
7 Petroleum Refining	-0.038	0.023	-0.060
8 Other Nondurables	0.050	0.109	-0.059
9 Fabricated Metals	0.066	0.051	0.016
10 Machinery Incl. Electric	0.057	0.131	-0.074
11 Transportation Equipment	0.021	0.082	-0.061
12 Other Durable Manufacturing	0.046	0.061	-0.015
13 Transportation and Public Utilities	0.057	0.046	0.011
14 Wholesale and Retail Trade	0.049	0.031	0.017
15 Finance, Insurance, Real Estate	0.051	0.078	-0.027
16 Services	0.045	0.091	-0.047
17 Government	0.066	0.028	0.037

Table 3
I-O Forecasts: Nominal Rates of Income Growth for 48 Sectors

KLTM Sector	Independent I-O Satellite Forecast	Disaggregated KEM Forecast
1. Livestock	0.073	0.022
2. Crops	0.075	0.023
3. Forestry, Commercial Fisheries	0.061	0.041
4. Agricultural Services	0.075	0.055
5. Metal & Nonferrous Mineral Mining	0.058	0.037
6. Coal Mining	0.078	0.056
7. Oil and Gas Extraction	0.047	0.027
8. Stone, Clay, and Gravel	0.061	0.040
9. Construction	0.059	0.045
10. Food Processing	0.059	0.061
11. Tobacco Processing	0.063	0.116
12. Fabrics and Apparel	0.065	0.059
13. Lumber and wood	0.059	0.111
14. Furniture and Fixtures	0.066	0.119
15. Paper Products	0.054	0.107
16. Printing and Publishing	0.055	0.108

(cont.)

Table 3 (cont.)

KLTM Sector	Independent I-O Satellite Forecast	Disaggregated KEM Forecast
17. Chemicals	0.056	0.109
18. Plastic Material and Synthetics	0.057	0.110
19. Drugs and Preparations	0.056	0.108
20. Paints	0.057	0.109
21. Petroleum Refining	0.044	-0.023
22. Rubber Products, Plastic Products	0.055	0.107
23. Leather and Leather Products	0.064	0.116
24. Glass, Stone, and Clay Products	0.061	0.113
25. Iron, Steel, Other Metal Products	0.052	0.055
26. Ordnance, Structural Metal	0.070	0.051
27. Engines and Machinery	0.069	0.138
28. Computers, Computing Equipment	0.063	0.131
29. Electrical Equipment, Appliances	0.055	0.123
30. Electronic Components and Parts	0.053	0.121
31. Motor Vehicles and Equipment	0.026	0.087
32. Aircraft and Parts	0.019	0.079
33. Other Transportation Equipment	0.045	0.107
34. Scientific, Photographic Equipment	0.061	0.064
35. Misc. Manufacturing	0.064	0.067
36. Transportation and Warehousing	0.063	0.041
37. Communications except Radio and TV	0.067	0.044
38. Business Services, Radio and TV	0.064	0.088
39. Electric Services, Utilities	0.081	0.058
40. Wholesale and Retail	0.067	0.031
41. Finance and Insurance	0.072	0.079
42. Real Estate and Rental	0.070	0.077
43. Hotels, Personal Services	0.070	0.094
44. Eating and Drinking Places	0.068	0.092
45. Automobile Repair and Services	0.071	0.096
46. Amusements	0.069	0.093
47. Health, Education, Social Services	0.070	0.094
48. Federal Government Enterprises	0.076	0.029

Acknowledgment

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Appendix

GENERAL NOTATION:

$\mathbf{M}_t$ = 48x48 steady state multiplier matrix, exports to output

$\mathbf{E}_t$ = 48x1 Kansas export vector for year t

$\mathbf{C}_t$ = 48x1 exogenous consumption demands for year t

$\mathbf{y}_t$ = 48x1 vector of Kansas domestic income coefficients

$\mathbf{M}^*_t$, $\mathbf{E}^*_t$, $\mathbf{C}^*_t$, $\mathbf{y}^*_t$ = adjusted values of $\mathbf{M}_t$, $\mathbf{E}_t$, $\mathbf{C}_t$, $\mathbf{y}_t$

$\mathbf{X}_t$ = 48x1 Kansas output vector for year t, either original estimate or independent I-O satellite forecast

$\mathbf{X}^*_t$ = 48x1 Kansas output vector for year t, disaggregated KEM forecast

$\mathbf{U}_t$ = Jx1 vectors of US incomes and other indicators of output and Kansas exogenous income from US Indiana model

$\mathbf{Y}_t$ = Lx1 vector of Kansas incomes from KEM, either actual or forecast

$\mathbf{G}$ = Lx48 aggregation matrix. Contains 1's and 0's, adds up 48 sectors to form L sectors. (See Table 1)

$\mathbf{V}$ = 48xJ weight matrix for output. Mostly 1's and 0's. However, if there are two useful US indicators for a single Kansas output, then each can have a weight of 1/2. (See Table 1)

$\mathbf{W}$ = Jx1 weight matrix for Kansas exogenous income

$\mathbf{I}$ = identity matrix (dimensions may vary)

L = number of KEM sectors = 17

J = number of Indiana-US sectors = 18

SPECIFIC DATA SOURCES:

$\mathbf{E}_{86}$ = export vector for year 1986, estimated using locational quotients at 4 digit SIC level

$\mathbf{M}_{81}$ = steady state multiplier matrix, exports to output, based on 1981 non-survey data. See Oslund et al. [1988]; and also Burress [1989]; Burress and Clifford [1988].

$\mathbf{C}_{81}$ = exogenous consumption demands (mainly from retirement income), based on 1981 non-survey data.

$\mathbf{y}_{81}$ = vector of Kansas wage and salary coefficients, based on 1981 non-survey data.

$\mathbf{X}_{86}$ = Kansas output vector, based on 1986 published data.

$\mathbf{U}_{86}$ = vector of US indicators of output and exogenous income, using 1986 historical data from the from Indiana-US model data base.

$\mathbf{U}_{88}$, $\mathbf{U}_{89}$ = vectors of US indicators of output and exogenous income, using 1989 and 1990 forecasts from the Indiana-US model, using assumptions chosen by Norman Clifford for his October 25 1989 forecast; Clifford [1989-1990]. A description of sectors together with growth rates and the assumed loadings onto $\mathbf{X}$ are given in Table 1.

$\mathbf{Y}_{86}$ = vector of Kansas wages and salaries using 1986 historical data from KEM

$\mathbf{Y}_{88}$, $\mathbf{Y}_{89}$ = vectors of Kansas wages and salaries using 1988 and 1989 forecasts from KEM; Clifford [1989-1990].

$\mathbf{B}$ = an inverse of $\mathbf{G}$ [i.e., $\mathbf{B}$ disaggregates L sectors evenly back into 48 sectors. So $\mathbf{GB}$ = $\mathbf{I}$ (LxL). However, $\mathbf{BG}$ isn't $\mathbf{I}$ (48x48)].

operators:

diag(.) denotes the diagonalization of a vector into a matrix (used on a vector expression)
^ denotes the same thing (but used as an overstrike on a single vector)
d denotes a growth rate operator (1989 to 1990)

THE INDEPENDENT I-O SATELLITE FORECAST:

1. Balancing the data for 1986:
We want to have a relationship like

$$\mathbf{Y} = \mathbf{G}\hat{\mathbf{y}}\mathbf{X} = \mathbf{G}\hat{\mathbf{y}}\mathbf{M}\{\mathbf{E}+\mathbf{C}\}$$

In particular, we seek to have the adjusted result

$$\mathbf{Y}_{86} = \mathbf{G}\hat{\mathbf{y}}^{*}_{81}\mathbf{X}_{86} = \mathbf{G}\hat{\mathbf{y}}^{*}_{81}\mathbf{M}^{*}_{81}\{\mathbf{E}^{*}_{86} + \mathbf{C}^{*}_{86}\}$$

A solution for **y*** is to prorate on **y** to give the result we want:

$$\mathbf{y}^{*}_{81} = \mathrm{diag}(\mathbf{BY}_{86})\mathrm{diag}(\mathbf{BG}\hat{\mathbf{y}}_{81}\mathbf{X}_{86})^{-1}\mathbf{y}_{81}$$

A solution for **M*,E*,C*** is to distribute all discrepancies proportionately across sectors and equally across **E**,**C**, and the generalized intermediate product demands **AX**, leading to the result that $\mathbf{X} = \mathbf{E} + \mathbf{C} + \mathbf{AX}$, as follows:

Let $\mathbf{M}_{81} = (\mathbf{I} - \mathbf{A})^{-1}$, so $\mathbf{A} = (\mathbf{I} - \mathbf{M}_{81}^{-1})$

Let $\mathbf{R} = \hat{\mathbf{X}}_{86}\mathrm{diag}[\mathbf{E}_{86} + \mathbf{C}_{86} + \mathbf{AX}_{86}]^{-1}$
Then take

$\mathbf{E}^{*}_{86} = \mathbf{RE}_{86}$,

$\mathbf{C}^{*}_{86} = \mathbf{RC}_{86}$, and

$\mathbf{A}^{*} = \mathbf{RA}$, leading to

$$\mathbf{M}^{*}_{81} = (\mathbf{I} - \mathbf{A}^{*})^{-1}$$

2. Making the predictions for t= 1989, 1990:
We now make Input-Output-type proportionality assumptions between Kansas and the US:

$$\mathbf{E}_t = \mathrm{diag}[\mathbf{VU}_t]\mathrm{diag}[\mathbf{VU}_{86}]^{-1}\mathbf{E}^{*}_{86}$$

$$\mathbf{C}_t = (\mathbf{W'U}_t/[\mathbf{W'U}_{86}])\mathbf{C}^{*}_{86}$$

This leads to the calculated estimate

$$\mathbf{Y}_t = \mathbf{G}\hat{\mathbf{y}}^{*}_{81}\mathbf{M}^{*}_{81}\{\mathbf{E}_t + \mathbf{C}_t\}$$

Then we calculate the predicted vectors of growth rates:

$$\mathbf{dU} = \hat{\mathbf{U}}_{89}^{-1}[\mathbf{U}_{90} - \mathbf{U}_{89}]$$

$$\mathbf{dY} = \hat{\mathbf{Y}}_{89}^{-1}[\mathbf{Y}_{90} - \mathbf{Y}_{89}]$$

In addition, we calculate our predicted growth rates at the 48 sector level:

$$\mathbf{X}_t = \mathbf{M}^{*}_{81}\{\mathbf{E}_t + \mathbf{C}_t\}$$

$$\mathbf{dX} = \hat{\mathbf{X}}_{89}^{-1}[\mathbf{X}_{90} - \mathbf{X}_{89}]$$

THE DISAGGREGATED KEM FORECAST:

3. Adjusting the 48 sector growth rates to reconcile with KEM

We seek to have the adjusted results

$\mathbf{Y}_{89} = \mathbf{G}\hat{\mathbf{y}}^{*}_{81}\mathbf{X}^{*}_{89}$ and

$$\mathbf{Y}_{90} = \mathbf{G}\hat{\mathbf{y}}^{*}_{81}\mathbf{X}^{*}_{90}$$

A solution for **X*** is to prorate on **X** and **Y** to give the result we want:

$$\mathbf{X}^{*}_{89} = \mathrm{diag}(\mathbf{BY}_{89})\mathrm{diag}(\mathbf{BG}\hat{\mathbf{y}}^{*}_{81}\mathbf{X}_{89})^{-1}\mathbf{X}_{89},$$

and similarly for $\mathbf{X}^{*}_{90}$

Then we calculate

$\mathbf{dX}^{*} = \hat{\mathbf{X}}^{*}_{89}{}^{-1}[\mathbf{X}^{*}_{90} - \mathbf{X}^{*}_{89}]$ = adjusted 48 sector growth rates

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Notes

1. A "satellite" model refers to a regional model which is driven by national forecasts generated from a separate national model. Both of the I-O models described in this paper are satellite models, as is KEM.

2. An earlier version of the "Independent I-O Satellite Forecast" was presented at the Kansas Regents' Economists Forecasting Conference at Lawrence, Kansas on October 17, 1989. A second version is documented in Burress et al. [1989].

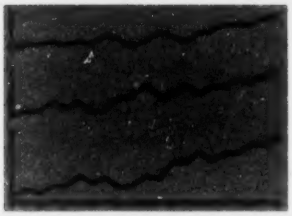
3. However, the KEM forecast is also a satellite forecast based on the Indiana US Model.

4. Burress [1989]. However, the present method depended on the entire 48x48 matrix of multipliers; only the 1x48 vector of column totals is reported above.

5. For a description of the 48 sectors, see Burress [1989].

6. However, in two previous runs of both this model and KEM (using earlier national forecasts), we obtained somewhat less encouraging results. In the worst case, the I-O forecast was nearly 2 percentage points (i.e. .02) higher than KEM in the general level of its predicted growth rates. Nevertheless, these differences are generally within the tolerance that one can reasonably place on a regional forecasting model.

7. An ordinary significance test is not appropriate for this correlation, because the sectoral growth rates cannot be construed to be independent observations; however, if such a test were appropriate, then this correlation would be insignificant with p=.1.



Economic Indicators

Comparison Indicators

	Quarter or Month	Current Period	Previous Period	Year Ago	% Change From	
					Previous Period	Year Ago
A. Personal Income - Annual rates, SA						
Kansas - Mil. $	3rd	41874.0	41631.0	38965.0	0.58	7.47
United States - Bil.$	4th	4537.43	4455.90	4185.20	1.83	8.42
B. Employment						
Kansas - Thou., NSA	4th	1215.37	1228.85	1220.25	-1.10	-0.40
United States - Mil., SA	4th	117.77	117.47	115.93	0.26	1.58
C. Unemployment Rate						
Kansas - % NSA	4th	3.9	4.1	4.6		
United States - % SA	4th	5.3	5.3	5.3		
D. Retail Sales - Annual rates						
Kansas - Mil. $, NSA	4th	18705.12	18770.18	17072.92	-0.35	9.56
United States - Bil. $, SA	4th	1727.48	1734.83	1668.70	-0.42	3.52
E. Consumer Price Index-U, All items, SA						
Kansas City* - 1982-1984 = 100	Jul-Dec	122.60	120.60	118.40	1.66	3.55
United States - 1982-1984 = 100	Jul-Dec	125.83	124.17	121.13	1.34	3.88

Kansas Indicators

	Quarter or Month	Current Period	Previous Period	Year Ago	% Change From Previous Period	% Change From Year Ago
F. New Incorporations, NSA						
For Profit - Number	4th	1159	1141	995	1.58	16.48
G. Tax Revenue, NSA						
General Fund Tax Revenue - Mil. $	4th	536.65	485.30	508.68	10.58	5.50
H. Operating Expenditures, NSA						
General Fund Operating Expenditures - Mil. $	4th	588.19	393.61	512.06	49.43	14.87

* The Kansas City CPI-U is published semi-annually with the first period being January through June average and the second period being July through December average. National employment and unemployment rate figures are based on the Current Population Survey (household survey). State figures are based on the Current Employment Statistics Survey (establishment survey).

NSA-Not seasonally adjusted.
SA-seasonally adjusted.

SOURCES: BEA, BLS, Ks. Dept. of Human Resources, Ks. Secretary of State, Ks. Dept. of Administration, Ks. Dept. of Revenue.

National Indicators

General Indicators	Quarter or Month	Current Period	Previous Period	Year Ago	% Change From Previous Period	% Change From Year Ago
A. Income Measures, Annual rates						
Gross National Product - Bil. 82$	4th	4172.40	4162.90	4069.40	0.23	2.53
Disposable Personal Income - Bil. 82$	4th	2938.50	2919.17	2835.97	0.66	3.62
Personal Consumption - Bil. 82$	4th	2692.60	2690.10	2627.70	0.09	2.47
Gross Private Investment - Bil. 82$	4th	720.00	724.60	709.10	-0.63	1.54
Net Export of Goods and Serv. - Bil. 82$	4th	-48.20	-57.10	-73.80		
Government Purchases - Bil. 82$	4th	807.90	805.30	806.40	0.32	0.19
Savings Rate - %	4th	5.67	5.27	4.57		
B. Labor Force						
Civilian Labor Force - Mil.	DEC	124.55	124.49	122.65	0.05	1.55
Employed - Mil.	DEC	117.89	117.84	116.14	0.04	1.50
Unemployed - Mil.	DEC	6.66	6.65	6.51	0.09	2.29
Unemployment Rates - percent						
All	DEC	5.30	5.30	5.30		
Women	DEC	5.50	5.40	5.30		
Men	DEC	5.30	5.30	5.30		
Teens	DEC	15.20	15.30	14.80		
Blacks and other than white	DEC	10.20	10.30	10.00		
Whites	DEC	4.60	4.50	4.60		
C. General Business						
Industrial Production - 1977 = 100	4th	142.17	142.23	139.90	-0.05	1.62
Manufacturing and Trade Sales - Bil. 82$	3rd	1399.50	1390.50	1370.80	0.65	2.09
Manufacturing and Trade Inventories - Bil. 82$	3rd	2093.01	2078.69	2035.41	0.69	2.83
New Orders, Durable Goods - Bil. 82$	4th	325.77	315.19	326.38	3.36	-0.19
Capacity Utilization, Mfg. %	4th	83.00	84.00	84.40		
New Housing Starts, Private - Thou.	4th	4024.00	4012.00	4631.00	0.30	-13.11
D. Prices						
Consumer Prices - 1982-1984 = 100						
CPI-U, All Items	DEC	126.30	125.80	120.70	0.40	4.64
Food	DEC	128.00	127.40	121.20	0.47	5.61
Housing	DEC	125.20	124.70	120.50	0.40	3.90
Apparel	DEC	119.00	119.40	117.80	-0.34	1.02
Transportation	DEC	115.00	114.60	110.60	0.35	3.98
Medical	DEC	155.10	154.20	142.90	0.58	8.54
Producer Prices - 1982-1984 = 100 (NSA)						
All Commodities	DEC	113.00	112.70	109.00	0.27	3.67
Industrial Commodities	DEC	112.30	112.20	108.10	0.09	3.89
Crude Materials	DEC	104.00	102.30	97.30	1.66	6.89
Capital Equipment	DEC	120.70	120.60	116.40	0.08	3.69
Agricultural Prices - 1977 = 100						
Prices Received	DEC	148.00	147.00	145.00	0.68	2.07
Prices Paid	DEC	178.00	178.00	173.00	0.00	2.89
E. Monetary and Credit Aggregates**						
Total Reserves	4th	5.70	0.30	-0.80		
M1	4th	6.70	1.50	2.30		
Commercial Banks						
Savings	4th	8.90	-0.20	4.00		
Small Denomination Time	4th	8.30	10.30	18.00		
Large Denomination Time	4th	1.50	2.10	13.00		
Thrift Institutions						
Savings	4th	4.10	-6.70	-2.50		
Large Denomination Time	4th	-28.40	-9.60	8.00		
Debt Components						
Federal	4th	9.60	4.60	7.60		
Nonfederal	4th	6.90	8.00	9.20		
Interest Rates - Monthly						
Prime Rate - %	DEC	10.50	10.50	10.50		
Discount Rate - %	DEC	7.00	7.00	6.50		

* Seasonally Adjusted

** Annual rates of change, seasonally adjusted in percent.

SOURCES: BEA, BLS, Survey of Current Business, Federal Reserve Bulletin.

Quarterly Employment in Kansas

	1989	1989	1988	% Change From	
				1989	1988
	Q4	Q3	Q4	Q3	Q4
A. General Indicators					
Civilian Labor Force - Thou.	1265.04	1281.35	1279.11	-1.27	-1.10
Employed - Thou.	1215.37	1228.85	1220.25	-1.10	-0.40
Farm Employment - Thou.	60.00	66.37	53.97	-9.59	11.18
Unemployed - Thou.	49.68	52.50	58.86	-5.37	-15.60
Initial Claims for Unemployment Insurance - Thou.	17.86	11.34	13.50	57.50	32.32
Average Work Week, Manufacturing - Hrs.	38.97	40.37	40.90	-3.47	-4.73
B. Industry Employment, in thousands					
All Industries	1071.07	1049.43	1052.40	2.06	1.77
Manufacturing	185.00	184.97	182.37	0.02	1.44
Durable Goods	110.50	110.70	109.07	-0.18	1.31
Fabricated Metal Production	10.67	10.97	11.47	-2.74	-6.98
Machinery (including Electrical)	30.43	30.27	29.73	0.55	2.35
Transportation Equipment	48.97	48.57	47.07	0.82	4.04
Nondurable Goods	74.50	74.27	73.30	0.31	1.64
Food and Kindred Products	26.77	26.57	26.60	0.75	0.63
Meat Products	14.53	14.27	14.37	1.87	1.16
Printing and Publishing	20.67	20.67	20.00	0.00	3.33
Petroleum and Coal	3.00	3.00	2.90	0.00	3.45
Mining	9.77	9.97	10.03	-2.01	-2.66
Oil and Gas Extraction	8.53	8.63	8.60	-1.16	-0.78
Contract Construction	43.23	45.03	42.47	-4.00	1.81
Transportation and Public Utilities	66.13	65.77	65.17	0.56	1.48
Wholesale Trade	68.10	68.13	67.73	-0.05	0.54
Retail Trade	195.83	192.00	195.47	2.00	0.19
Finance, Insurance, and Real Estate	58.73	58.93	58.30	-0.34	0.74
Services	224.20	222.90	216.50	0.58	3.56
Federal Government	30.57	30.43	29.43	0.44	3.85
State and Local Government	189.50	171.30	184.93	10.62	2.47

SOURCES: BLS, Ks. Dept. of Human Resources.

Quarterly Kansas Retail Sales Subject to Sales Tax*

	1989	1989	1988	% Change From	
				1989	1988
	Q4	Q3	Q4	Q3	Q4
Sales, in Millions					
Apparel	466.78	472.35	462.32	-1.18	0.96
Automotive	3185.97	3639.24	3133.15	-12.46	1.69
Food	4358.45	4268.18	4038.87	2.12	7.91
Furniture	881.87	892.22	1379.19	-1.16	-36.06
General Merchandise	2965.34	2926.90	2457.22	1.31	20.68
Lumber and Building Materials	1403.49	1385.75	1293.38	1.28	8.51
Professional and Personal Services	1503.03	1597.41	1035.50	-5.91	45.15
Public Utilities	406.86	352.63	827.52	15.38	-50.83
Unclassified	1473.13	1467.89	1408.64	0.36	4.58
Farm and Garden Products	24.89	22.96	25.44	8.40	-2.15
Manufacturing and Trading	929.86	940.12	1001.93	-1.09	-7.19
Miscellaneous	5.14	24.52	9.76	-79.05	-47.36
Total	17604.82	17990.17	17072.92	-2.14	3.12

NOTE: Retail sales figures are based on sales tax collections. Actual and reported retail sales may vary.

* Annual Rates

SOURCE: Ks. Dept. of Revenue.

Quarterly Personal Income in Kansas*

				% Change From	
	1989 Q3	1989 Q2	1988 Q3	1989 Q2	1988 Q3
A. Personal Income					
Total - Mil. $	41874	41631	38965	0.58	7.47
Nonfarm Income - Mil. $	41213	40388	38185	2.04	7.93
Farm Income - Mil. $	661	1243	779	-46.82	-15.15
Average Weekly Earnings, Mfg.** - $	414	419	426	-1.23	-2.75
B. Earnings by Industry, in Millions					
Nonfarm	28091	27441	26114	2.37	7.57
Farm	661	1243	779	-46.82	-15.15
Manufacturing	5750	5580	5266	3.05	9.19
Durable Goods	3659	3518	3305	4.01	10.71
Nondurable Goods	2091	2061	1961	1.46	6.63
Mining	314	309	315	1.62	-0.32
Contract Construction	1547	1517	1572	1.98	-1.59
Transportation and Public Utilities	2425	2412	2256	0.54	7.49
Wholesale Trade	2083	2064	1943	0.92	7.21
Retail Trade	2735	2707	2616	1.03	4.55
Finance, Insurance, and Real Estate	1692	1624	1587	4.19	6.62
Services	6342	6052	5714	4.79	10.99
Federal Government	923	901	832	2.44	10.94
State and Local Government	712	708	695	0.56	2.45

* Seasonally adjusted, at annual rates

** Not seasonally adjusted.

SOURCES: BEA, Ks. Dept. of Human Resources.

Monthly Kansas Agricultural Indicators*

				% Change From	
	1989 December	1989 November	1988 December	1989 November	1988 December
Prices Received					
All Farm Products - 1977 = 100	179	179	178	0.00	0.56
All Crops - 1977 = 100	151	149	158	1.34	-4.43
Wheat - $/Bu.	3.83	3.81	3.76	0.52	1.86
Sorghum Grain - $/Bu.	3.54	3.59	3.95	-1.39	-10.38
Corn - $/Bu.	2.25	2.24	2.58	0.45	-12.79
Soybeans - $/Bu.	5.47	5.45	7.42	0.37	-26.28
All Hay - $/Ton	79.00	76.00	90.00	3.95	-12.22
Livestock and Products - 1977 = 100	197	197	190	0.00	3.68
All Beef Cattle - $/Cwt.	74.40	75.50	73.10	-1.46	1.78
Steers and Heifers - $/Cwt.	76.80	77.30	75.70	-0.65	1.45
Calves - $/Cwt.	86.40	87.90	88.80	-1.71	-2.70
Hogs - $/Cwt.	48.10	42.90	39.60	12.12	21.46
Milk - $/Cwt.	15.90	14.90	13.70	6.71	16.06

* Not seasonally adjusted.

SOURCE: Ks. Crop and Livestock Reporting Service.

Quarterly Employment and Sales for SMSAs and Counties

				% Change From	
rea	1989 Q4	1989 Q3	1988 Q4	1989 Q3	1988 Q4
. Wichita SMSA					
Civilian Labor Force - Thou.	258.75	260.69	256.75	-0.74	0.78
Employed - Thou.	247.32	249.48	244.91	-0.87	0.98
Unemployed - Thou.	11.44	11.21	11.84	1.99	-3.45
Rate - %	4.43	4.33	4.63		
Retail Sales - Mil. $	898.30	944.97	884.80	-4.94	1.53
. Kansas Portion of Kansas City SMSA					
Civilian Labor Force - Thou.	323.77	327.96	326.34	-1.28	-0.79
Employed - Thou.	311.60	315.01	311.26	-1.08	0.11
Unemployed - Thou.	12.17	12.95	15.08	-6.02	-19.32
Rate - %	3.77	3.97	4.63		
Retail Sales - Mil. $	1029.98	1094.25	1020.20	-5.87	0.96
. Topeka SMSA					
Civilian Labor Force - Thou.	90.30	92.05	91.74	-1.89	-1.56
Employed - Thou.	86.77	87.79	87.31	-1.17	-0.63
Unemployed - Thou.	3.54	4.26	4.42	-16.87	-20.01
Rate - %	3.90	4.63	4.80		
Retail Sales - Mil. $	306.78	328.78	307.73	-6.69	-0.31
. Lawrence SMSA					
Civilian Labor Force - Thou.	42.07	40.72	41.67	3.32	0.96
Employed - Thou.	40.81	39.32	40.20	3.78	1.52
Unemployed - Thou.	1.26	1.40	1.48	-9.68	-14.40
Rate - %	3.00	3.43	3.57		
Retail Sales - Mil. $	118.91	119.91	113.96	-0.83	4.34
. Riley County--Manhattan Area					
Civilian Labor Force - Thou.	28.71	27.13	28.79	5.82	-0.30
Employed - Thou.	27.79	26.27	27.64	5.77	0.53
Unemployed - Thou.	0.92	0.85	1.15	7.33	-20.07
Rate - %	3.20	3.13	4.00		
Retail Sales - Mil. $	61.71	62.62	59.33	-1.46	4.02
. Reno County--Hutchinson Area					
Civilian Labor Force - Thou.	30.19	30.98	30.82	-2.57	-2.07
Employed - Thou.	28.92	29.61	29.23	-2.31	-1.05
Unemployed - Thou.	1.26	1.38	1.59	-8.31	-20.79
Rate - %	4.20	4.43	5.17		
Retail Sales - Mil. $	99.50	102.86	99.51	-3.26	-0.01
. Crawford County--Pittsburg Area					
Civilian Labor Force - Thou.	16.98	16.86	16.90	0.66	0.45
Employed - Thou.	16.19	16.03	16.00	1.00	1.22
Unemployed - Thou.	0.78	0.83	0.90	-5.78	-13.21
Rate - %	4.60	4.93	5.33		
Retail Sales - Mil. $	45.06	45.80	42.98	-1.61	4.85
. Lyon County--Emporia Area					
Civilian Labor Force - Thou.	19.37	19.19	19.76	0.92	-1.99
Employed - Thou.	18.58	18.47	18.80	0.60	-1.19
Unemployed - Thou.	0.79	0.72	0.96	8.97	-17.81
Rate - %	4.07	3.77	4.87		
Retail Sales - Mil. $	49.69	53.37	49.79	-6.90	-0.20
Saline County--Salina Area					
Civilian Labor Force - Thou.	26.71	27.16	27.72	-1.64	-3.64
Employed - Thou.	25.67	25.97	26.34	-1.13	-2.52
Unemployed - Thou.	1.04	1.19	1.38	-12.73	-24.90
Rate - %	3.90	4.37	4.97		
Retail Sales - Mil. $	99.30	106.08	99.23	-6.39	0.07
Barton County--Great Bend Area					
Civilian Labor Force - Thou.	14.21	14.56	14.67	-2.37	-3.15
Employed - Thou.	13.70	13.92	13.88	-1.59	-1.31
Unemployed - Thou.	0.51	0.64	0.79	-19.48	-35.29
Rate - %	3.63	4.40	5.40		
Retail Sales - Mil. $	55.51	58.33	55.03	-4.85	0.87
. Montgomery County--Coffeyville Area					
Civilian Labor Force - Thou.	17.78	18.27	17.83	-2.69	-0.31
Employed - Thou.	16.92	17.20	16.82	-1.64	0.62
Unemployed - Thou.	0.85	1.06	1.01	-19.77	-15.78
Rate - %	4.80	5.80	5.67		
Retail Sales - Mil. $	51.56	52.27	46.32	-1.37	11.30

OURCES: Ks. Dept. of Human Resources, Ks. Dept. of Revenue.

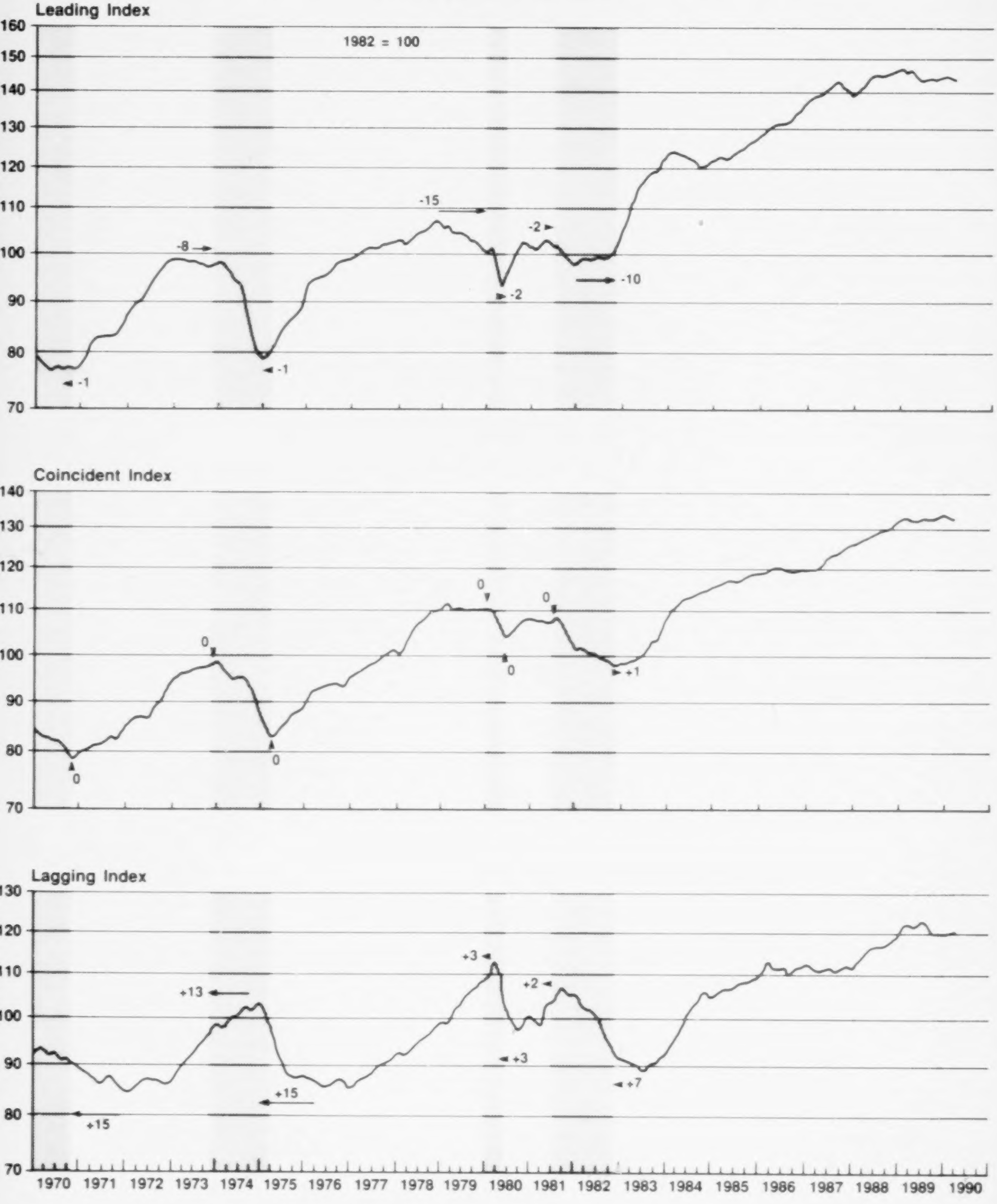
Quarterly Banking and Savings and Loan Activity in Kansas*

	1989 Q4	1989 Q3	1988 Q4	% Change From 1989 Q3	1988 Q4
Federal Reserve Member Banks					
A. Kansas, in Millions					
Total Deposits	38786.7	38480.0	37390.4	0.80	3.73
Total Checkable	6197.0	6020.3	6246.1	2.93	-0.79
Demand Deposits	3012.7	2909.7	3070.5	3.54	-1.88
Other Checkable	3184.3	3110.7	3175.6	2.37	0.27
Small Time and Savings	26340.7	26081.7	24959.8	0.99	5.53
Large Time	6249.0	6378.0	6195.4	-2.02	0.86
B. Kansas City, KS, in Millions					
Total Loans	1767.45	1761.16	1768.06	0.36	-0.03
Real Estate	984.72	979.61	938.49	0.52	4.93
Commercial and Industrial	515.92	524.28	541.97	-1.60	-4.81
Consumer	95.78	92.93	95.99	3.06	-0.22
Total Deposits	2117.17	2086.36	1986.70	1.48	6.57
Demand Deposits	204.79	202.34	229.94	1.21	-10.94
Time and Savings	1220.38	1203.12	1135.98	1.43	7.43
C. Topeka, in Millions					
Total Loans	404.77	391.50	375.75	3.39	7.72
Real Estate	143.49	133.32	113.01	7.63	26.97
Commercial and Industrial	127.42	133.17	141.08	-4.32	-9.68
Consumer	75.09	71.30	73.02	5.32	2.84
Total Deposits	558.53	526.45	520.16	6.09	7.38
Demand Deposits	146.05	143.05	160.00	2.10	-8.72
Time and Savings	263.77	243.39	222.48	8.37	18.56
D. Wichita, in Millions					
Total Loans	1415.90	1365.14	1383.32	3.72	2.36
Real Estate	316.44	308.41	282.45	2.60	12.03
Commercial and Industrial	467.95	463.91	508.22	0.87	-7.92
Consumer	473.48	436.24	436.97	8.54	8.35
Total Deposits	2085.19	2084.46	1973.47	0.04	5.66
Demand Deposits	459.46	443.61	467.53	3.57	-1.73
Time and Savings	1090.79	1092.75	1004.91	-0.18	8.55
Savings and Loan Activity, in Millions					
E. Kansas					
Total Assets	22521.37	22787.57	22646.23	-1.17	-0.55
Mortgage Loans	14102.50	14397.73	14560.93	-2.05	-3.15

* The data above pertain only to Federal Reserve member banks of Kansas and do not represent all commercial banking in the state. Since 1980, these data have covered approximately 50 percent of the state's banking activity.

SOURCES: Federal Reserve Bank of Kansas City and Federal Home Loan Bank Board of Topeka.

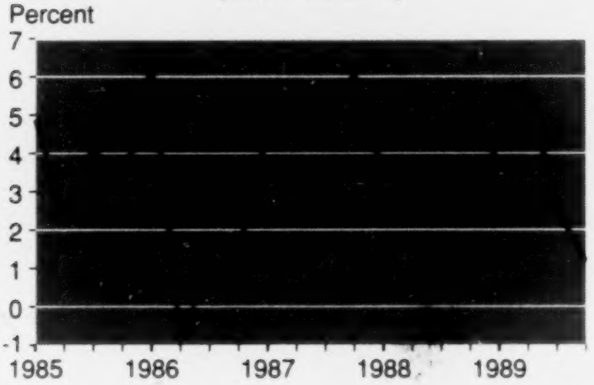
U.S. Composite Indexes



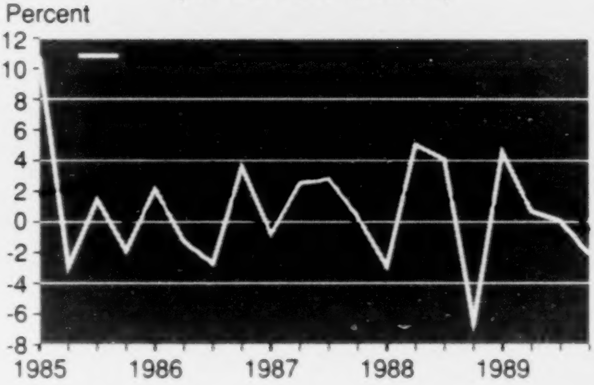
Source: Bureau of Economic Analysis, *Business Conditions Digest.*

Note: Numbers entered on the chart indicate length of leads (—) and lags (+) in months from reference turning dates. Shading indicates periods of recession.

Average Annual Growth Rate of GNP
(1982 Dollars)



Growth of Retail Sales
(In Current Dollars)



Rate of Inflation
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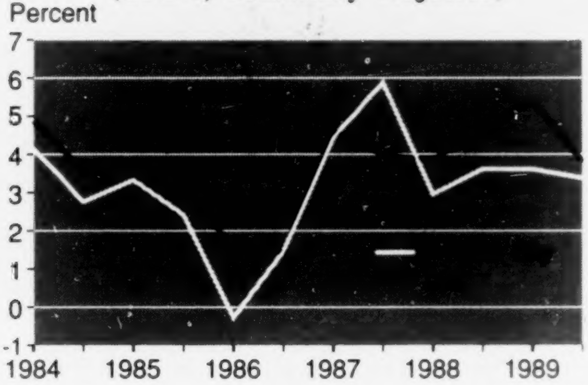
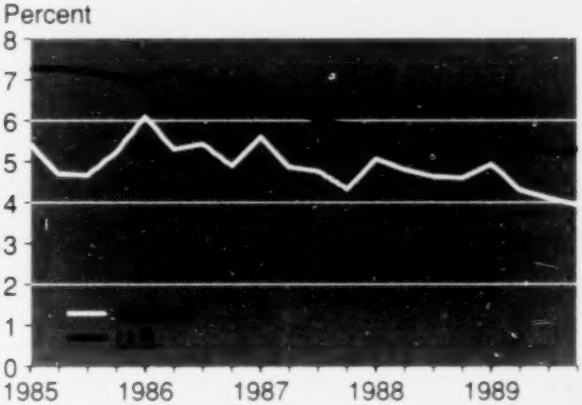


Civilian Unemployment Rate



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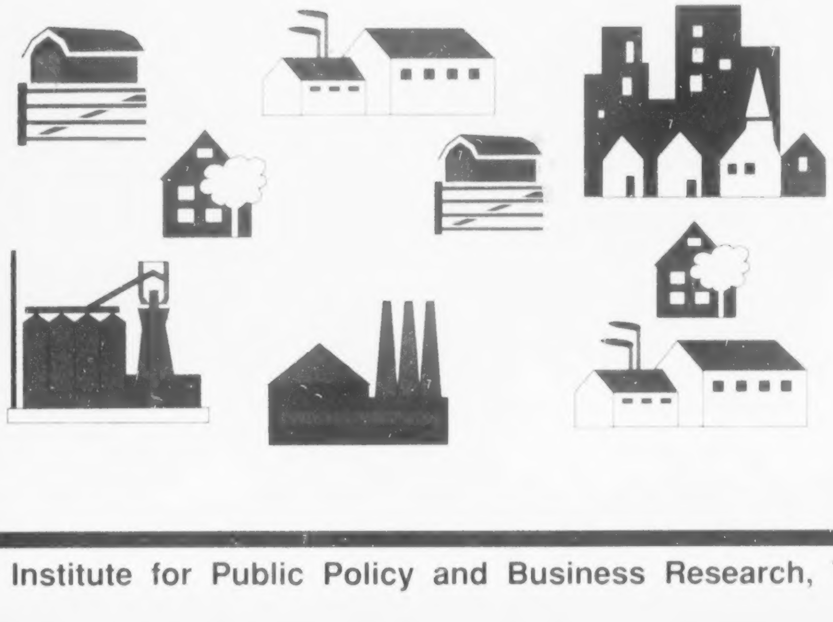

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Economic Indicators

Institute for Public Policy and Business Research, The University of Kansas

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The Impact of Property Tax Reappraisal and Classification 1

Glenn Fisher, *Regents Professor, Wichita State University*

Attempts to correct with reappraisal and classification the neglect of property tax administration that had occurred in Kansas over a period of many years brought unexpected problems. Good alternatives are few, but a case can be made for reducing the dependence on the property tax.

Kansas Business Taxes in a Competitive Environment: Results from a Simulation Model 6

Patricia C. Oslund, *Research Associate, Institute for Public Policy and Business Research, University of Kansas*

This article, which examines state and local business taxation in Kansas and the surrounding region, reveals that the state's tax climate favors new businesses over mature firms.

The Economic Effects of the 1989 Increase in the Kansas Gasoline Tax 16

Robert Glass, *Research Associate, Institute for Public Policy and Business Research, University of Kansas*

A gasoline tax increase went into effect in Kansas on July 1, 1989. What is the price tag of this program? How will the tax increase affect the Kansas economy?

The Outlook for Kansas and the Nation, 1990 23

Norman Clifford, *Research Associate, Institute for Public Policy and Business Research, University of Kansas*

Any shock that causes the national economy to falter will be transmitted to a slowly growing Kansas economy.

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The purpose of the *Kansas Business Review* is to provide a forum for the dissemination of research studies and reports in the fields of economics and business and related public policy that would be of special interest and relevance to business persons, public officials, and academicians in Kansas and the Plains Region.

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The Impact of Property Tax Reappraisal and Classification

Glenn W. Fisher

Dr. Glenn Fisher is Regents Professor of Urban Affairs, Wichita State University. He was project director for a study of the impact of property tax reappraisal and classification carried out under a contract between Kansas Inc. and the Hugo Wall Center for Urban Studies at Wichita State University. Much of the information in this article is from that report.[1]

Introduction

On January 1, 1989, a 1986 amendment to the revenue article of the Kansas Constitution providing for the classification of property for taxation, the exemption of inventories and farm machinery, and the assessment of business machinery on a depreciated cost basis became effective. On the same date the assessed values resulting from a three and one-half year effort to reappraise property became official.

These were major changes in a property tax system that had seen no major modifications for over two decades. These changes created many large shifts in property tax bills and generated enormous controversy. Stories of individuals and businesses receiving tax bills several times larger than those of the previous year are common, causing concern both for the equity and the economic effects of the changes.

Because three major changes--reappraisal, classification, and exemption of large classes of business personal property--occurred at the same time, there is much confusion about the extent of the changes and their causes. The study sponsored by Kansas Inc. attempts to measure the changes and, as far as possible, to indicate the causes of these changes.

Origins of Constitutional and Statutory Changes

The property tax is the major source of local government tax revenue in Kansas, providing about 85 percent of the tax revenue received directly by local governments and about 38 percent of the tax revenue of state and local governments combined. Property taxes are equal to 90.5 percent of the total amount collected from the general sales and income taxes.

Prior to reappraisal the quality of appraisal of property for tax purposes was appalling. The statutes forbade countywide reappraisal even though assessment/sales ratio studies showed that similar properties in the same localities were assessed at very different percentages of value. These conditions clearly violated the constitutionally-mandated uniformity requirement and presented the possibility of a court-ordered reappraisal.

After considering the issue for many years, in 1985 the legislature passed a package providing for the implementation of use-value assessment of agricultural land, reappraisal of all property, and a vote on a constitutional amendment. This package was a compromise among many interested groups, but most believed that it would moderate tax shifts among the classes of real estate resulting from reappraisal and would aid economic development by encouraging those mobile, economically important industries that have large amounts of inventory and machinery to remain or to locate in Kansas.

The most important features of the constitutional amendment were provisions that residential real estate and vacant lots be assessed at 12 percent of appraised value, agricultural land be assessed at 30 percent of use value, and other real estate be assessed at 30 percent of appraised value. Formerly, all real and tangible personal property which was subject to general property taxes was, allegedly, appraised uniformly and assessed at 30 percent of appraised value. The amendment would place a higher burden on commercial and industrial real estate, but the burden on the business community would be offset, at least in part, by the exemption of merchants' and manufacturers' inventories and by assessing business machinery and equipment on the basis of depreciated cost, rather than market value.

The reappraisal law provided that counties would be responsible for reappraisal and must use a modern computer-assisted appraisal system. The state director of property valuation was given the responsibility of supervising the reappraisal and training appraisal personnel.

Problems in Measuring Changes

Although the groups that negotiated the compromise and the legislature that adopted it in 1985 had many computer runs showing probable effects, not everybody fully understood the changes that would occur. To some extent this was inevitable. The effect of such massive changes on an individual tax bill depends upon the change in the assessment of the individual property and the change in tax rate. The tax rate, in turn, depends upon the tax levy (in dollars) of the units of government taxing the property and the assessed value within the boundaries of all these units. Because the mix of property types is different in every district, classification and reappraisal affect assessed values and, consequently, the tax rate, differently within each district. It was possible, in 1985, to approximate the shifts among classes of property, but not everyone understood that the effect on individual properties could differ greatly from the average. It was known, for example, that the increased taxes on business real estate would be roughly equal to the decreased taxes on inventory and machinery, but it was very difficult for a business owner to estimate the net effect on his or her firm.

Even after the fact, there are a number of difficulties involved in measuring the changes that occurred. The changes in total property tax levies accompanying the constitutional and statutory changes can be relatively easy to deal with, and it is also possible to document shifts among the three broadest classes of property--real estate, personal property, and state assessed utility property, but the shifts among the various sub-classes of real estate are difficult to measure. Part of the problem is the change in the way property is classified for administrative and statistical purposes. The classes of real estate and personal property for which data were reported prior to 1989 were replaced by the classes prescribed in the classification amendment, making it impossible to determine the impact of the changes upon a particular class of property from reports summarizing assessed values or taxes levied on classes of property in 1988 and 1989. To make accurate comparisons it is necessary to make a parcel by parcel reclassification so that the class definitions are uniform for both years.

Reappraisal also brought changes in the way data are collected and reported. All counties now are required to use uniform computer software for appraisal purposes, but there is no uniform way of comparing 1988 and 1989 data; in fact, 1988 data were not computerized in many counties. Another problem resulted from the extended appeal process: data used in the report were collected at different times and may have changed as a result of successful assessment appeals. In spite of the difficulties, the data collected provide a reasonably good estimate of the shifts among real estate classes that occurred in the ten counties chosen for intensive study.

Changes in Tax Levies

Taxes are levied by dollar amounts in Kansas, but local officials, citizens, and the media often interpret a change in the mill rates as an increase or decrease in the property tax. This means that a reappraisal, which usually results in increased total assessed values in a taxing jurisdiction, offers an opportunity for a tax windfall. Governmental units can increase the dollar amount of levies while pointing to a decreased mill rate as evidence that taxes have declined. To prevent this, the reappraisal bill included a tax lid that was intended to limit the tax levies that could be made in 1989, the year reappraisal was to become effective. The tax lid provisions of the reappraisal law provided that, with some exceptions, 1989 levies, stated in dollar amounts, could not exceed 1988 levies.

There have been charges that the lid was ineffective, that 1988 taxes levied were "padded" in order to create a larger base for 1989 taxes, or that there were too many exemptions in the law. In an effort to analyze the effectiveness of the lid, the study compared 1988 and 1989 tax levies with those that would have been expected if reappraisal and classification had not occurred. Taxes levied for each type of government were projected using 1980-87 data, and the actual levies for 1988 (budget year 1989) and 1989 (budget year 1990) were compared with the projections. Levies above projections in 1988 are consistent with the hypothesis that local units increased levies in order to establish a higher base for 1989 levies. Levies above the 1989 projections are consistent with the hypothesis that the tax lid failed to prevent levies in the year of reappraisal from being higher than normal, either because of the exceptions in the budget lid or because 1988 levies had been "padded." Because of the many variations in local situations, this method did not indicate whether or not governmental units in a particular county were guilty of unwise spending or improper actions, but statewide data give an indication of the effectiveness of the tax lid.

Table 1 summarizes the statewide results and shows that levies were higher than would have been expected on the basis of past trends. Levies for school districts, subject to a different kind of tax and budget limitation, deviated least from the projections. The large 1989 increase in state levies results from the fact that these levies were fixed at 1.5 mills.

The magnitudes by which the levies exceeded the projection were not large enough to explain the large increase in taxes reported by many complaining taxpayers. These increases can only be explained by shifts from parcel to parcel or from property class to property class.

Table 1
Percentages by Which Tax Levies Exceed Projections*

Unit	1988	1989
State Governments	-1.5	23.8
County Governments	4.8	11.2
Cities	6.8	9.3
School Districts	1.9	0.3
Townships	9.3	4.7
Special Districts	3.4	29.3
All Governments	2.6	4.0

* Projections are based on 78 counties except "all governments" which is based on 105 counties.

Shifts Among Broad Classes of Property

Because property taxes levied against the three broad classes of property--real estate, personal property, and state assessed property--have been reported in the past, and because there has been little change in the definitions of these classes, it is possible to measure the shifts among

Table 2
Shifts Among Broad Property Classes in 78 Counties

Class	No Shift Levy 1989	Actual Levy 1989 (Thousands)	Amount Greater	Percent Change
Real Estate	$812,251	$1,039,177	$226,926	27.9
Personal Property	360,833	165,105	-195,728	-54.2
State Assessed Property	187,812	156,613	-31,199	-16.6
Total	$1,360,896	$1,360,896	$0	0.0

Source: Calculated from data provided by county clerks. The "no shift" levy is the levy that would have resulted if each class paid the same percentage of the total as it paid in 1988.

those classes. This was done by computing the amount of the 1989 levy that would have been levied against each type of property if it had constituted the same percentage as in 1988. The results, summarized for 78 counties, are shown in Table 2. In these counties the levy against real estate was $226.9 million greater than it would have been if real estate had been the same portion of the tax in 1989 as in 1988, an increase of 27.9 percent. Personal property paid $195.7 million or 54.2 percent less and state assessed utility property paid $31.2 million or 16.6 percent less.

If these percentages are projected to all 105 counties on the basis of total assessed valuation, taxes on real estate were $270 million more than they would have been without the shift. Taxes on personal property were $233 million less and taxes on state assessed property (utilities and railroads) were $37 million less.

The reasons for these shifts are easy to understand:

1. There was little change in the assessment procedures applied to state assessed property; therefore, the increase in assessed values was nominal. The decrease in taxes on this class arose from the lower tax rates that resulted from total assessed values being higher.

2. The lower taxes on personal property reflect both the exemption of large amounts of personal property and the lower tax rates.

3. The increase in real estate taxes resulted from the higher assessed values after reappraisal. This increase in total assessed values of real estate would have been much higher except for the provision in the classification amendment that residential property and vacant lots be assessed at 12 percent rather than at 30 percent.

Real Estate Tax Shifts

Measuring the shifts among classes and parcels of real estate was much more difficult than measuring shifts among the broad classes of property. In Johnson, Sedgwick, Shawnee and Wyandotte counties a computerized "matched parcel" approach was used to match the parcels in 1989 property classes with the same parcels in 1988, in order to determine the change in the taxes levied on that class of property. In Johnson and Sedgwick counties, the matched parcel approach was supplemented by comparing 1988 and 1989 taxes on a sample of property drawn from various classes of real estate. In the counties of Ford, Montgomery, Saline, Seward, Thomas and Washington stratified random samples were selected from parcel printouts, and 1988 and 1989 taxes were obtained from the records of the county appraiser or county clerk. In every county in which sample parcels were drawn, frequency distributions or printouts showing data for individual parcels provided information concerning the degree of variation within classes.

Tax Shifts Among Parcels in the Same Class of Real Estate

Even a casual perusal of the data makes it obvious that there were very large changes in taxes levied on particular parcels of real estate. The largest variations occurred within the vacant lot class; within that class the largest change involved commercial or industrial lots. Certain kinds of vacant lots are very difficult to appraise because of the thinness of the market, and a particular lot may be in little demand until it, or adjoining lots are chosen for high-use development. Perhaps because of this uncertainty and perhaps because vacant lots are of less consequence in the tax base than are developed lots, many Kansas appraisers previously paid little attention to their assessment. The data compiled for the study included many cases of vacant lots on which the taxes rose by thousands of percent as a result of reappraisal; often, however, this huge percentage increase was from a 1988 tax of two or three dollars.

Statistical analysis of assessment before reappraisal shows that many parcels of real estate were assessed at only a small fraction of the average level of assessment and that others were assessed several times higher than the average, a violation of the constitution and the common law of taxation. Correcting these inequities, with or without classification, required many large tax shifts.

Another interesting, and politically significant, fact is that tax increases were smaller, but more numerous, than tax decreases: a result of a statistical artifact. No assessment could go below zero, but some pre-reappraisal assessments were several times the average level. As a result, the distribution of assessment/sales ratios were skewed so that equalizing assessments resulted in more tax increases than decreases, even when the total tax on the class of property remained unchanged, increasing the pressure upon political leaders and administrative officials. Property owners whose taxes increased are much more apt to be politically active than are those who enjoyed decreases.

Class to Class Shifts in Real Estate Taxes

Because of the great place-to-place variation and the methodological difficulties encountered in the study, summaries of the class to class shifts must be used cautiously. Table 3 shows the estimated percentage shifts for three important classes of real estate: commercial property, industrial property, and residential property.

These data confirm that there were large increases in taxes on commercial and industrial real property. Except in Thomas and Washington counties, taxes on commercial property, as a class, more than doubled. The change in taxes on industrial property shows more county to county variation. In Thomas County, where there were only a few parcels of industrial property, there was a 43.5 percent decrease, and in Seward County there was a 374.8 percent increase; in two counties separate estimates of the shift in industrial property taxes were not obtained. In two of the other six the increase on industrial property was greater than the increase on commercial property. Classification is a major cause of these increases: commercial and industrial real estate is included in the new constitutional class "other" which is assessed at 30 percent of appraised value; in contrast, residential property and vacant lots are assessed at 12 percent. In most counties the shift of taxes to commercial and industrial property caused by classification was moderated somewhat by the fact that such property was appraised at a higher percent of value than was residential property prior to reappraisal.

The increases in the taxes on residential property were much more moderate. In five counties the increases on single family residential property was less than fifteen percent. In Wyandotte County, where single family residential data were not obtained, the increase on all types of residential property was 35.5 percent. As is true of other classes of real estate, increases varied from place to place within a county. In Shawnee County the residential increase was 23.2 percent, but in some townships near Topeka the increase was much larger.

A study of detailed data for Wyandotte County[2] (the only county for which such detail was available), permitted the development of an estimate of the shift that would have occurred if reappraisal had been implemented without the classification amendment: taxes on residential real estate would have gone up 82.2 percent, rather than the actual 35.5 percent; taxes on commercial and industrial property would have gone up only 24.5 percent rather than the actual 131.6 percent. Although Wyandotte is not a typical county, the data showed that shifts would have been very different without the classification amendment.

In Johnson and Sedgwick counties, the only counties in which apartments were analyzed separately from other residential property, there were substantial declines in the tax levied on apartments: -55 percent and -27 percent, respectively. The reasons for this are not apparent, for although, prior to reappraisal, multi-family residential property was assessed somewhat lower than residential property generally, this would not explain a decline in 1989 taxes of this magnitude.

Data presented in the full report indicate that the increase in the taxes levied on vacant lots, especially in the more urban areas, was very large, as a result of reappraisal. Vacant lots, like residential properties, are now assessed at 12 percent of appraised value, but median level of assessment of vacant lots before reappraisal was very low, and the new methods of appraisal resulted in large and often controversial increases in appraised values.

Taxes on unimproved agricultural land are now based on use value assessment, leading to a decrease in taxes on such land. Buildings and other improvements on agricultural land continue to be as-

Table 3
Estimated Change in Real Estate Taxes, Selected Classes, 1988-1989

County	Commercial (% Change)	Industrial (% Change)	Single Family Residential County (% Change)
Johnson	102.4 (144)	178.0 (156)	13.0 (75)
Sedgwick	115.0 (99)	68.0 (84)	14.3 (172)
Shawnee ***	113.0	77.5	23.2 **
Wyandotte ***	131.6 *	*	35.5 **
Ford	140.1 (119)	111.2 (27)	17.2 (80)
Montgomery	104.6 (112)	115.1 (36)	26.3 (87)
Saline	116.8 (146)	110.7 (61)	25.3 (87)
Seward	105.6 (69)	374.8 (11)	10.8 (64)
Thomas	42.6 (87)	-43.5 (14)	13.8 (68)
Washington	78.7 (129)*	*	13.0 (76)

Numbers in parentheses indicate sample size for that class.

* Commercial and industrial classes combined.

** All Forms of residential property.

*** Matched parcel approach. All parcels that could be matched were utilized.

Source: Hugo Wall Center for Urban Studies, "Report on Reappraisal and Classification," Kansas Research Report. (Topeka, Kansas: Kansas Inc., March 30, 1990). Data are from random sample study, except for Shawnee and Wyandotte counties. For matched parcel results for Johnson and Sedgwick counties see the report.

Table 4
Average Changes in Personal Property Taxes, 1988-89 Shawnee County

Type of Business Tax	Average Decrease	Percent of 1988 Personal
Retail	$ 8,986.66	71.9
Manufacturing	166,656.93	54.3
Service	1,538.04	23.9

Source: Random sample of businesses drawn from printout of Shawnee County personal property taxpayers. (From *Information Report*, submitted to Kansas Inc., April 18, 1990.)

sessed at market value and, as a result, taxes on agricultural land with buildings have risen by amounts roughly comparable to the rise in the taxes on urban residential property.

Personal Property Taxation

The tax package developed by the Kansas Legislature in 1985 shifted real estates taxes onto business property, but the provisions for taxing business machinery and equipment on the basis of depreciated cost value and exempting merchants' and manufacturers' inventories were expected to partially offset those additional burdens in a way that would be beneficial to economic growth in Kansas.

It is clear from the data showing the shifts among broad classes of property (Table 2) that personal property as a class has been relieved of a substantial tax burden; it is more difficult to determine how this has impacted particular firms. A random sample of 65 firms drawn from the Shawnee County personal property tax roll indicates that most firms received substantial reductions in personal property tax bills. The largest percentage reductions went to retailers and the smallest to service businesses. The largest decrease was $2,003,000, which amounted to 59.9 percent of the firm's 1988 personal property tax. Average changes, by type of firm, are summarized in Table 4.

It is difficult and time consuming to determine the net effect of real and personal property tax changes on a particular firm. Many businesses receive several real estate or personal property tax bills, often in different corporate names; real estate leases contain a variety of provisions regarding pass through of tax increases, and market conditions influence the extent to which taxes can be passed through when new leases are negotiated. Attempts to determine the real estate taxes paid on the buildings occupied by the 65 businesses in Shawnee County suggest that in about half the cases the real estate and personal property taxes decreased and in about half they increased.

Summary

Neglect of property tax administration on the part of Kansas' state and local officials over a period of many years resulted in an unconstitutional and inequitable distribution of the property tax burden. Reappraisal, ordered by the 1985 legislature, and the classification amendment, approved by the voters in 1986, were attempts to correct this problem. It was expected that the classification amendment would shield homeowners and farmers from much of the tax increase resulting from reappraisal, and the exemption of merchants' and manufacturers' inventories would reduce the shift to business property and improve the economic climate of the state.

The controversy that erupted since these measures became effective was intensified by misinformation about the nature and magnitude of the shifts. The study by Kansas Inc. attempted to provide accurate, timely information; unfortunately, the situation is so complicated and so fluid that this was a difficult process. Many of the large increases in individual tax bills result from previous underassessment of the property, and taxes on real estate as a class, and especially business real estate, have increased greatly as a result of classification. There have been large reductions in taxes on business personal property.

With the continuing appeals process and the political pressure on the legislature and local officials, the situation will continue to change. The legislature considered many proposals in the 1990 session, but good alternatives were few. It is constitutionally and practically unwise to scrap the millions of dollars that have been invested in an attempt to install a modern, mass appraisal system. The classification amendment is written into the constitution and it is unlikely that Kansans would vote to return to equal taxation of residential and business property. Elimination of favorable tax treatment of inventory and machinery would be opposed by important elements in the business community.

A case can be made for reducing the dependence upon the property tax; in fact, a study by this author in 1986 concluded that the property tax is overused in Kansas.[3] This would require the raising of replacement revenues, however--never an easy task. Almost as difficult would be determining an efficient and economic method of returning state-raised revenue to the local government. It is difficult to devise formulas for returning money to general units of local government that are equitable and avoid overcompensating some units or encouraging overexpenditure.

Notes

1. Wichita State University, Hugo Wall Center for Urban Studies, *Report on Reappraisal and Classification*, Kansas Research Report. Topeka, Kansas: Kansas Inc., March 1990.

2. *Report on Reappraisal and Classification*, p. xiii.

3. Glenn W. Fisher, "State and Local Finances," in *Kansas Policy Choices*, ed. H. Edward Flentje (Lawrence, Kansas: Univ. Press of Kansas, 1986), pp. 75-108.

Kansas Business Taxes in a Competitive Environment: Results From a Simulation Model

Pat Oslund

Pat Oslund is a research associate at the Institute for Public Policy and Business Research.

Introduction

Kansas policy makers have long been concerned with business taxation and how it fits into the general framework of economic development. The issue came to a head during 1985, with major changes in the Kansas tax code following in the 1986, 1987, and 1988 legislative sessions. The issue was resurrected in 1990 due to widespread dissatisfaction over the effects of reappraisal and classification.

Business taxes and tax incentives have been tied, correctly or incorrectly, to state efforts for economic development and growth throughout the region. State development strategies exhibit two broad roles for business taxes. Taxes may be used in a pro-active sense, targeting investment through large incentives. This approach has recently been initiated in Nebraska. Alternatively, the strategy may be to neutralize the tax issue by removing or reducing those taxes found to impede growth. This approach is spelled out in the Redwood-Krider report on Kansas economic development, which recommends bringing Kansas taxes into line with competing states.[1]

In order to create policies to neutralize the tax issue, it is first necessary to have reliable quantitative information on how Kansas actually fares in comparison with the region, and under what circumstances taxes may place Kansas at a competitive disadvantage. Kansas Inc., a public-private partnership which funds and conducts research on Kansas public policy, asked the Institute for Public Policy and Business Research (IPPBR) to investigate these issues. The Institute updated an earlier tax study, and developed a tax simulation model to estimate the quantitative effect of taxes on representative firms in fifteen important industries in the region.[2] The analysis was conducted for a study area including Kansas, Colorado, Iowa, Missouri, Nebraska, and Oklahoma.

This article presents results from the Institute's research, emphasizing the role of taxes in economic development. Part 1 of the article reviews the academic literature on state and local taxation and focuses on the controversy over the relationship between taxation and growth.

Part 2 of the article presents a description of tax rates and the bases to which they apply, in order to provide background material on business taxes in the six state region surrounding Kansas. The role of business incentives in the state tax structures is carefully noted, since incentives can make a substantial difference in the tax bills of new and expanding firms.

Part 3 of the article makes use of the IPPBR Tax Simulation Model to compare Kansas taxes with those in nearby states and to explore a number of issues concerning the importance of taxes in business location decisions. The simulation approach captures the interaction of state tax rates, tax bases, incentives, and basic business costs. For this reason, the model gives a more complete picture of the Kansas business tax climate than can be provided by a comparison of tax rates alone. The model gives quantitative estimates of the size of interstate tax differences, the value of incentives, and the importance of taxes in relation to other business costs.

Part 1: How do State and Local Taxes Affect Businesses?

Throughout the 1980s, state and local governments played an increasingly active role in trying to attract and retain jobs. Their efforts were particularly intense in areas which experienced declines in traditional manufacturing and extractive industries due to changes in global competitive conditions. Tax policy was a major focus of the attempt to stimulate a healthy economy in many states. At the national level, reforms during the mid-1980s lowered marginal tax rates for corporations, and several states copied the rate reduction, including Colorado, which lowered the corporate tax rate for upper income brackets. However, much of the push for state tax reform during the 1980s was directed toward the use of special tax credits and abatements. Tax incentives, along with other inducements such as industrial revenue bond financing, dominated state and local involvement in efforts to encourage business growth.

State and local governments have spent considerable time and money developing and implementing both general tax reforms and specific tax incentive programs. Ironically, there is considerable debate about whether the general level of state and local taxation, or any of the specific abatement programs, influences job and investment growth. The issue has been examined numerous times and in numerous ways.[3] Studies examining the impact a state's general tax structure have arrived at mixed and often contradictory conclusions. Recently a consensus seems to be emerging that increases in overall state tax effort negatively affect state income growth.[4] However, the question of whether business taxes or personal taxes most affect growth is still unsettled.

Like studies examining general taxes, studies of the effect of specific incentives also have failed to resolve the question of whether the programs stimulate growth. For example, Steinnes[5] finds no evidence that industrial bond finance incentives increase the number of jobs in manufacturing or services; in contrast, Papke[6] discovers that subsidized bond financing positively affects the number of new firms locating in a state. Papke also finds that tax incentives influence firm location through their effect on the after-tax rate of return of a new investment.

In summary, the academic literature has offered policy makers little clear guidance about the proper role of taxation in state economic development strategies. If, as Papke argues, both corporate tax rates and incentives influence firm locations, then state and local governments must be extremely concerned that they create a competitive tax environment; alternatively, if personal taxes are more responsible for economic growth than corporate taxes or incentives, the emphasis on incentive packages may be ineffective, and, in fact, wasteful. Blair and Premus suggest that choosing a location for a new establishment is really a two stage process, with the firm choosing a general region for investment in the first stage and a specific site in the second stage.[7] Taxes and incentives may become important at the second stage for firms which have already decided to locate in a particular region.

Part 2: State and Local Business Taxes in the Region Surrounding Kansas

State and local governments levy three important taxes on businesses: corporate income taxes, property taxes, and sales taxes. In addition, firms are required to participate in two special funds which provide benefits to employees: unemployment insurance and worker compensation. Taxes rates and the bases on which taxes are charged vary widely across the states in the region. Differences in the definitions of tax bases may cause business taxes to vary more widely across states than would be expected by a simple comparison of tax rates.

The Corporate Income Tax

Each of the states in the region levies a corporate income tax on net profits or taxable income derived from within the state. As a source of state finance, the corporate tax appears small, comprising less than 10 percent of total state tax revenue for the U.S. on average; in Kansas, dependence on the corporate income tax approximates the U.S. average. While corporate income taxes may be a small source of total revenue, they are, however, an important cost to businesses: of taxes paid to state and local governments, the corporate income tax generally ranks second after the property tax.

Income Tax Rates. Corporate tax rates in the region surrounding Kansas average between 5 and 6 percent. On the low end, Kansas taxes the first $25,000 of income at 4.5 percent; on the high end, Iowa taxes incomes over $250,000 at 12 percent. Colorado is now in the process of implementing a rate reduction from 6 percent to 5 percent for high-income firms. Under emergency financial pressure due to unanticipated tax refunds to pensioners, Missouri has recently instituted a temporary tax increase from 5 percent to 6.5 percent for high income firms. Kansas experimented with an alternative minimum tax on corporations in 1988, but has now repealed the tax. It is important to note that comparisons of state tax rates can be misleading, for the states exhibit considerable variations in the allowable deductions, in income allocation methods, and in economic development incentives, all of which influence corporate tax bills.

Deduction for Federal Taxes. All of the states in the region use federal taxable income as a starting point for state tax calculations. To generalize, federal taxable income is then modified through additions and deductions. Two states in the region permit a deduction for federal taxes paid: Missouri allows a deduction of 100 percent of federal taxes, while Iowa allows a 50 percent deduction, both of which substantially reduce tax liabilities. Table 1 quantifies the impact of the deduction by contrasting statutory and adjusted marginal tax rates.

Income Allocation for Multi-State Firms. When a firm does business in several states, a serious problem arises over how the taxable income of the firms should be divided among competing tax jurisdictions. Since each state is free to decide its own allocation rules, there is no assurance that exactly 100 percent of income will be taxed overall. Nationally, a "three factor" formula based on sales, payroll, and property serves as a standard for income allocation. In states employing the formula, the firm calculates the ratio of in-state to total sales, the ratio of in-state to total payroll, and the ratio of in-state to total property. The average of these three ratios gives the fraction of the firm's income taxed by the state.

As an alternative to the three factor formula, some states rely on allocations based on sales and property, or on sales alone. The choice of allocation formula significantly changes the amount of income subject to in-state taxation, an important fact for an export oriented firm--that is, a firm selling a large percentage of its output outside state boundaries. The higher the weight given to sales, the lower will be the allocation fraction for such firms. Under a sales only criterion, the export oriented firm pays only a small amount of taxes to the state in which production facilities are located.

Property Tax

Both state and local governments levy taxes on the value of land, buildings, and equipment owned by firms and households. For the most part, however, property taxes are a tool of local rather than state governments; indeed, property taxes provide the single largest source of local revenue in all six states. Within the region surrounding Kansas, property tax shares range from 57 percent of local tax revenues in Missouri, to 98 percent in Iowa; Kansas local governments raise

Table 1
State Corporate Income Tax Rates, Federal Deductibility, and Income Allocation Methods

State	Statutory Rates	Marginal Adjusted Rates[1]	Federal Deductibility	Income Allocation Method
Colorado	For FY 1987-1988:		No	Choice of two factor formula (1/2 sales, 1/2 property), or three factor formula (1/3 each sales, property, payroll).
	First $50,000 -- 5.5%	5.5%		
	Excess of $50,000 -- 6%	6.0%		
	Beginning in FY 1989:			
	A flat rate of 5% will be phased in, fully effective July 1, 1993.	5.0%		
Iowa	First $25,000 -- 6%	5.0%	50% of federal income tax is deductible	Single factor formula based on sales only. Sales in Iowa defined as shipped or delivered to Iowa destinations.
	Next $75,000 -- 8%	6.6%		
	Next $150,000 -- 10%	8.3%		
	Over $250,000 -- 12%	10.0%		
Kansas	First $25,000 -- 4.5%	4.5%	No	Three factor formula (1/3 each sales, property, payroll). For firms with payroll factor more than twice the average property and sales factors, a two factor formula based on sales and property is an option.
	Over $25,000 -- 6.75%	6.75%		
Missouri	Flat 5%[2]	3.3%	100% of federal income tax is deductible	Choice of single factor formula based on sales only, or three factor formula (1/3 each sales, property, payroll). For use in sales only formula, sales in Missouri include all sales with destinations and origins in Missouri, plus half of all sales with either the origin or destination in Missouri, but not both.
	Effective Jan. 1, 1990-Dec. 1991:			
	Less than $100,000 -- 5%	3.3%		
	$100,000-$335,000 -- 6%	4.0%		
	More than $335,000 -- 6.5%	4.3%		
Nebraska	First $50,000 -- 5.58%	5.58%	No	Three factor formula (1/3 each sales, property, payroll).
	Over $50,000 -- 7.81%	7.81%		
Oklahoma	Flat 5%	5.0%	No	

[1] The calculation assumes a marginal federal tax rate of 34%.
MARGINAL ADJUSTED RATE = STATUTORY RATE x (1 - .34 x deductibility fraction).

[2] Missouri also has a local corporate income tax in the cities of Kansas City and St. Louis. This earnings tax is equal to 1% of net profits from activities in the city.

Note: Rates are for 1989 unless otherwise indicated.

Sources: Information provided by individual state departments of revenue, state statutes, and *All State Tax Guide* (Englewood Cliffs, NJ: Prentice Hall, 1988).

over 82 percent of their revenues from this source.

Property taxes impose a significant cost on firms. For example, a 1988 IPPBR study estimated that, for the typical firm, property taxes are second in size only to federal income taxes;[8] however, the impact of the tax varies substantially from state to state and from industry to industry. The actual tax paid by a firm results from a complex interaction of tax rates, the types and amount of property owned, the definition of the tax base, assessment practices, and whether the firm qualifies for any special tax incentives.

The concept of *effective property tax rates* provides a key to understanding property taxation and to comparing taxes across states. The definition of an effective tax rate is simple: it is the annual tax bill divided by the true market value of a piece of property. Effective rates vary not only among states, but also among the major categories of property: residential real estate, commercial real estate, business machinery and equipment, and inventories.

Components of the Effective Tax Rate. Calculating an effective tax rate is easier in theory than in practice. In fact, any estimate of the rate must include three components: the applicable mill levy, the statutory assessment ratio, and the relationship between appraised and market property values.

A mill levy is a tax rate expressed as the dollar tax per $1000 assessed valuation. The total mill levy on a piece of property generally results from a combination of county taxes, city taxes, school district taxes, and taxes for special services such as sewers or fire protection. Within a single state, mill levies vary widely.

Statutory assessment ratios define the percentage of a property's appraised value which is entered on the tax rolls. Three states in the region apply different statutory ratios to different property classifications; for example, Kansas currently assesses residential property at 12 percent, commercial and industrial real estate at 30 percent, and industrial machinery at 20 percent.

No area of property taxation causes more controversy than property appraisal. Ideally, property appraisals should reflect true market values; in practice, the divergence can be dramatic, particularly when reappraisals are few and far between. A striking example of this has recently occurred in Kansas: prior to 1989, assessments were based on real estate appraisals as much as twenty years old. Increases in property values came as a shock to many homeowners and business owners.

Table 2
Estimates of Effective Property Tax Rates (taxes as % of actual market value)

State	Real Estate Rates			Other Property Rates		
Colorado	Industrial	2.38%		Mach. and equip.	2.00%	
	Commercial	2.86%		Inventories	not taxed	
	Residential	1.16%				
Iowa	Industrial	2.57%		Industrial machinery and computers	.77%	
	Commercial	2.57%		Other business property not taxed.		
	Residential	2.07%		Inventories not taxed.		
Kansas		(1988)	(1989)		(1988)	(1989)
	Industrial	1.67%	3.34%	Mach. and equip.	3.91%	2.23%
	Commercial	1.48%	3.34%	Inventories	3.91%	no tax
	Residential	.94%	1.38%			
Missouri	Industrial	1.80%		Mach. and equip.	1.57%	
	Commercial	1.80%		Inventories not taxed.		
	Residential	.89%				
Nebraska	Industrial	2.31%		Mach. and equip.	2.49%	
	Commercial	2.31%		Inventories not taxed.		
	Residential	2.18%				
Oklahoma	Industrial	.90%		Mach. and equip.	.90%	
	Commercial	.90%		Inventories	.90%	
	Residential	.91%				

Note: All rates are for 1988 except as shown. Effective rates were estimated by IPPBR based on information provided by the individual states.

Effective Tax Rates in the Region. Table 2 presents estimates of the effective property tax rates in the region surrounding Kansas. The estimates for Kansas compare effective tax rates before and after reappraisal and classification. Changes in the Kansas property tax system have increased the share of taxes paid by commercial and industrial real estate, while reducing the share paid by machinery, equipment, and inventories.

Sales Tax

Most state governments, including those of the six states investigated in this study, impose an ad valorem tax on retail sales. During the 1980s the sales tax has grown in importance, and within the past five years all of the states in the region have legislated increased sales tax rates, either on a permanent or a temporary basis. Local taxes have experienced a similar upward trend.

Sales Tax Rates. State sales tax rates in the region fall within a narrow range, between a low of 3 percent in Colorado and a high of 4.425 percent in Missouri (Table 3); both Missouri and Kansas have increased rates within the last year. Local sales tax rates add to the tax total, and in

Table 3
Sales Tax Rates, 1989

State	State Tax	Local Tax
Colorado	3% 0.2% tax on tourism related goods and services.	May be levied, not to exceed 4%.
Iowa	4%	May be levied up to 1%; also local option hotel/motel tax may be levied, not to exceed 7%.
Kansas	4.25%	May be levied at 0.5% or 1% by both counties and cities.
Missouri	4.425% Will drop to 4.125 % on July 1, 1990.	May be levied, not to exceed 3%; St. Louis county may levy up to 3.375% tax.
Nebraska	4%	May be levied at 1-1.5%.
Oklahoma	4%	May be levied, county not to exceed 2%.

Source: Information provided by individual state departments of revenue.

some jurisdictions rival state taxes in magnitude; for example, Denver taxes most sales at 3.5 percent in addition to the state tax. In parts of Kansas City, Missouri, local taxes stand at 2.25 percent, while in Overland Park, Kansas, taxes reach the state allowed maximum of 2 percent.

Sales Tax Base. Most states use a fairly broad concept of retail sales in defining their sales tax bases; in fact, the sales tax combines elements of a tax on consumption, a tax on investment, and a tax on production. The extent to which each of these three activities is taxed depends on state specific rules for sales tax exemptions and inclusions.

Perhaps the most important business sales tax exemption is an exemption for the purchase of new machinery and equipment. All of the states in the region surrounding Kansas allow this exemption in some form, although the specific requirements for the exemption vary considerably among them. Kansas exempts equipment and machinery used directly in manufacturing, processing, or storing goods; within Kansas enterprise zones, exemptions are even more generous, extending to most service industries (Table 3).

Labor Taxes

Payments into two funds, unemployment insurance and worker compensation, add considerably to the cost of labor. Rates vary by state and, particularly for worker compensation, by industry; in some states and industries, the additional cost can top 8 percent. Table 4 shows that Kansas rates compare favorably with those of other states in the region.

Table 4
Worker Compensation Rates (1988) and Unemployment Insurance Rates (1987)
(average payment per $100 payroll)

	CO	IA	KS	MO	NE	OK
Unemployment Insurance	.79	1.69	.94	.64	.57	1.08
Worker Compensation						
Electronics	4.32	1.77	1.72	2.31	2.26	3.61
Construct. Mach. Manf.	8.74	5.60	3.57	3.90	5.62	6.53
Plastics	7.01	4.94	4.77	5.98	3.12	7.17
Data Processing	.89	.96	0.90	1.08	2.12	2.23

Sources: U.S. Department of Labor and National Council on Compensation Insurance.

Tax Incentives

All of the states in the region make extensive use of tax incentive programs; in most cases, incentives are targeted toward new jobs and investment activity. Incentives apply to each of the major business taxes: income, property, and sales, but the specific amounts of the incentives and the rules for eligibility vary widely from state to state[9] (Table 5).

Part 3: The Results of the Tax Simulation Model

IPPBR has developed a tax simulation model to translate general information about state tax structures and business costs conditions into estimates of taxes and costs for specific industries and locations. Results of the model are presented in the four examples which follow.

The model displays a simple general structure composed of three main elements. The first element is a computer program representing the tax climate in each state in the region. The program incorporates data on tax rates, tax bases, and available incentives. The program fully accounts for interactions among federal, state, and local taxes. The second element of the model is a set of industry profiles for representative firms with 50 employees in each of fifteen industries. The profiles include national averages for asset values, costs, and profitability. The final element is a database of local cost adjustment factors. Wages, utility costs, land prices, and other factors affecting the firm's bottom line vary substantially from location to location within the six state study region. Location specific cost information is used to modify the firm profiles.

The model produces estimates of the taxes and costs for typical firms in the chosen industries. In brief, property taxes are calculated on the basis of the firm's assets, income taxes on the basis of sales minus costs, sales taxes on the basis of taxable business purchases, and labor taxes (social security, unemployment insurance, and worker compensation) on the basis of wages and salaries. All results of the model are carried out for fifteen years and then converted to annual averages.

Table 5
Major Business Tax Incentives in the Region: States Offering Incentives

Type of Incentive	CO	IA	KS	MO	NE	OK
Tax Credit for Job Creation	Y	Y	Y	Y	Y	Y
Tax Credit for New Investment	Y	N	Y	Y	Y	Y
Research and Development Tax Credit	Y	Y	Y	N	Y	N
Property Tax Exemption or Moratorium on Land or Structures	R	Y	Y	Y	N	Y
Property Tax Exemption or Moratorium on Machinery or Equip.	N	Y	Y	N	R	N
Sales and Use Tax Exemption on New Equipment	Y	Y	Y	Y	R	Y
Sales Tax Exemption on Raw Materials Used in Manufacturing	Y	Y	Y	Y	Y	Y

Y: the incentive is offered to a wide range of firms in the state.
R: the incentive is offered under very restrictive conditions.
N: the incentive is not offered.

Note: Eligibility for tax credits and abatements may depend on whether the firm is located in an enterprise zone, or whether the firm is a manufacturer. Details can be found in Pat Oslund, *Business Taxes in Kansas and Nearby States*, (Lawrence, Kansas: Institute for Public Policy and Business Research, forthcoming).
Source: Compiled from information provided by the individual states.

Advantages of Simulation Models

The simulation approach has several distinct advantages as a tool to study state tax structures and interstate competitiveness:

1. The model captures feedback effects among federal, state, and local taxes. For example, state taxes are generally deductible from federal taxable income. Due to an effect known as the *federal offset*, a $100 reduction in state taxes increases a firm's federal tax liability, so that the total saving is less than $100.

2. The simulation model can quantify the impact of tax credits and abatements. Information on the incentive programs of each state is incorporated into the computer program.

3. The model can be run for a variety of community sizes. For example, it is possible to compare the situation of a typical firm choosing to locate in a small city in Kansas with the situation which would face the firm in a small city in Iowa or Oklahoma. To date, the model has been applied for eleven major urban areas in the region, and for a sample of medium and small sized communities.

4. Finally, the model has the capability to capture the interaction between taxes and basic business costs. For example, property taxes depend on the value of a firm's real estate as well as on tax rates.

The simulation model has been designed to allow the user to make alternative sets of assumptions about the situations of the representative firms. Major assumptions fall into three categories:

1. The degree to which the firms qualify for tax credits, deductions, and abatements.

2. The apportionment of income for multi-state firms.

3. The importance of costs other than taxes on location decisions.

Each set of assumptions is discussed in more detail below. Whether a firm receives tax incentives can make a large difference in its final tax bill. The examples presented in this article contrast two alternative sets of assumptions. In Example 1, firms are assumed to qualify for all incentives allowed for new firms in their respective industries. The firm is assumed to locate in an enterprise zone in the states where enterprise zone credits exist. Many states offer local governments some discretion in the magnitude of incentives which may be offered; for example, property tax abatements in a state may range from 50 percent to 100 percent. For the purpose of this study, however, firms are assumed to receive the maximum incentives allowed by state law. The first scenario approximates the situation of a "footloose" firm which can shop for the best incentive package available in the region.

The alternative scenario, employed in Example 2, offers the firm no special tax credits or abatements. This scenario is intended to represent the situation of a mature, long established firm which is currently neither expanding nor changing locations. The mature firm pays taxes in line with the basic tax structure of the state in which it is located. A mature firm may be discouraged from making additional investments in a state by a high business tax level. Although the situation of an expanding firm is not explicitly considered by the model, it can be thought of as a combination of the new firm and mature firm cases.

Another key assumption of the Tax Simulation Model is whether the firm is a multi-state business. In general, a firm is considered a multi-state enterprise if its property, payroll, or sales are located in more than one state. Multi-state firms create complex problems for state taxation, since the income of the firm must be divided among two or more locations for tax purposes. The federal government cannot compel the states to follow any national guidelines for income allocation methods. For the purposes of these examples, firms are assumed to locate all of their property and payroll within a single state. In contrast, they are assumed to sell only 10 percent of their output in-state; that is, the firms are export oriented. The location decision of an export oriented firm is more likely to be influenced by tax and cost considerations than is the decision of a firm with strong ties to consumers in local markets.

The final set of assumptions concerns the extent to which differences in non-tax costs are built into the model. The appropriate set of assumptions depends on the type of question the user is trying to address. If the user is interested in distinguishing differences in state tax structures, a model which holds all other costs constant across locations is suitable. On the other hand, the user may be interested in assessing the attractiveness of business locations in Kansas relative to the surrounding region. In this case, an extended model which builds in local cost adjustment factors for labor, land, utilities, and other key inputs, is a more appropriate tool. Examples 1 and 2 assume that all factors except taxes are constant across states, while Examples 3 and 4 rely on the extended model.

In the examples which follow, the model is used to make interstate comparisons for a sample of four industries. The industries are chosen to represent a variety of characteristics:

1. The electronics firm manufactures high tech products using a very capital intensive technology. According to a survey in *Site Selection and Industrial Development*, capital per worker in a new firm averages $136,000.[10]

2. The fabricated metal products firm represents more traditional heavy industry. New firms in this industry invest approximately $110,200 per worker.

3. The average firm in the plastics manufacturing industry requires less capital per worker, according to the survey: approximately $55,000. The industry represents light manufacturing.

4. In the data processing industry,

Table 6
Taxes for Typical New Firms Qualifying for Maximum Allowable Tax Incentives

	INDUSTRY			
State	**Electronics**	**Fabricated Metal Products**	**Plastics**	**Data Processing**
Colorado				
Taxes	$677,026	$633,068	$361,343	$175,493
Rank in Region	5	6	6	2
Iowa				
Taxes	$634,303	$554,860	$352,730	$176,147
Rank in Region	1	1	5	3
Kansas				
Taxes	$641,241	$560,027	$343,916	$190,145
Rank in Region	3	3	2	6
Missouri				
Taxes	$661,139	$570,418	$327,797	$164,590
Rank in Region	4	4	1	1
Nebraska				
Taxes	$692,383	$593,811	$352,397	$180,301
Rank in Region	6	5	4	4
Oklahoma				
Taxes	$639,192	$556,994	$346,658	$186,243
Rank in Region	2	2	3	5

Note: Taxes include federal income taxes, state income taxes, sales taxes, labor taxes, franchise taxes, and property taxes. The lowest taxed state is ranked as 1. All calculations are for medium sized cities. Results are measured in 1987 dollars.
Source: IPPBR Tax Simulation Model.

capital intensity averages $17,000. The industry represents the business service sector, an increasingly important part of the Kansas economy.

Examples of Model Results

Example 1: How do the taxes facing a typical new firm in a Kansas location compare with taxes at locations in other states? Many states offer tax incentives to compete for new jobs and investment. Even those states which might prefer to avoid the use of incentives may be forced to offer them to avoid losing business to their neighbors.

The tax simulation model quantifies the impact of incentives offered to new businesses. As shown in Table 6, Kansas taxes fall in the average range for manufacturing; the tax climate appears favorable for new manufacturing firms contemplating Kansas locations. Thus it would appear that Kansas has achieved the goal of neutralizing the tax issue for new manufacturers. In contrast, taxes for the one service firm in the sample, data processing, appear to be the highest in the region. The explanation is straightforward: in Kansas, new manufacturing firms are sheltered by property tax abatements of up to 10 years; on the other hand, service firms fail to qualify for property tax abatements, and hence bear the full impact of high Kansas property tax rates.[11]

Example 2: How competitive is the Kansas tax climate for mature firms? A firm which has been established at its current location for several years generally fails to qualify for business tax incentives--that is, unless the firm expands or moves. It follows that the tax climate facing the established firm may differ significantly from that of a new firm; in fact, the tax credits and abatements offered to new firms may shift the burden of taxation to a state's long term business residents. The tax simulation model can be used to compare the taxes facing mature firms in the region.

Table 7
Taxes for Typical Established Firms Qualifying for No Tax Incentives

	INDUSTRY			
State	**Electronics**	**Fabricated Metal Products**	**Plastics**	**Data Processing**
Colorado				
Taxes	$700,135	$652,021	$371,720	$180,079
Rank in Region	3	5	5	3
Iowa				
Taxes	$636,756	$557,287	$354,468	$177,341
Rank in Region	1	1	1	2
Kansas				
Taxes	$773,752	$668,617	$408,059	$198,771
Rank in Region	6	6	6	6
Missouri				
Taxes	$711,300	$614,736	$360,462	$177,256
Rank in Region	4	3	2	1
Nebraska				
Taxes	$753,615	$629,010	$366,195	$186,301
Rank in Region	5	4	4	4
Oklahoma				
Taxes	$677,194	$587,944	$363,549	$188,777
Rank in Region	2	2	3	5

Note: Taxes include federal income taxes, state income taxes, sales taxes, labor taxes, franchise taxes, and property taxes. The lowest taxed state is ranked as 1. All calculations are for medium sized cities. Results are measured in 1987 dollars.
Source: IPPBR Tax Simulation Model.

Table 7 shows the simulation results. Kansas taxes appear to be the highest in the region for all four industries: the Kansas property tax is primarily responsible for the result. The medium sized communities included in the sample levied an average mill rate of 133, which translates into an effective tax rate of nearly 4 percent on commercial real estate. The simulations suggest that Iowa is the lowest taxed location in the region, a conclusion which follows directly from the structure of the Iowa income tax. As pointed out earlier, Iowa relies on a sales-only allocation formula; therefore, for export oriented firms located in Iowa, most income will be exempt from the state corporate income tax.

Although business taxes appear high for mature firms, taxes are only one of many components that comprise a state's business climate. As Table 8 shows, the moderate level of non-tax costs improves the overall competitive position of the state.

Example 3. How important are interstate tax differences in comparison with differences in basic production costs? Multiple factors influence a firm's decision of where to locate. In addition to taxes, basic business costs such as land and labor, the availability of transportation, and community features such as schools and recreational opportunities all enter into the decision process. A large number of location factors fall outside the scope of the simulation model, particularly those factors concerning the quality of life in a community; on the other hand, the simulation model is designed to compare the influence of two location factors, taxes and basic costs.

Table 8
Taxes, Costs, and Standard Deviations
(firms with 50 employees in medium sized cities)

Industry	Electronics	Metals	Plastics	Data Proc.
New Firms				
Medium City, Kansas				
Costs: Non-tax	$2,418,615	$3,413,527	$3,912,325	$3,002,091
Total Taxes[1]	$641,241	$560,027	$343,916	$190,145
State and Local Taxes[1]	$119,387	$126,109	$80,524	$62,837
Total Taxes[2]	$652,518	$574,181	$352,826	$202,475
Tax and Non-tax Costs	$3,071,133	$3,987,708	$4,265,152	$3,204,566
Regional Average				
Costs: Non-tax	$2,456,778	$3,461,149	$3,945,539	$3,038,285
Total Taxes[1]	$657,547	$578,196	$347,474	$178,820
State and Local Taxes	$163,896	$169,146	$96,043	$62,837
Taxes[2]	$655,778	$576,348	$343,472	$178,267
Tax and Non-tax Costs	$3,112,557	$4,037,497	$4,289,011	$3,216,551
Standard Deviations				
Costs: Non-tax	$63,648	$69,515	$69,011	$55,580
Taxes[1]	$21,455	$27,988	$13,114	$10,073
Tax Dev. as % of Cost Dev.	33.7%	40.3%	19.0%	18.1%
Tax Dev. as % of Total Taxes	3.3%	4.8%	3.8%	5.6%
Established Firms				
Medium City, Kansas				
Costs: Non-tax	$2,424,196	$3,417,985	$3,914,586	$3,003,569
Total Taxes[1]	$773,752	$668,617	$408,059	$198,771
State and Local Taxes[1]	$311,976	$283,693	$173,214	$73,220
Total Taxes[2]	$785,900	$683,878	$417,933	$211,775
Tax and Non-tax Costs	$3,210,096	$4,101,863	$4,332,519	$3,215,344
Regional Average				
Costs: Non-tax	$2,462,542	$3,465,575	$3,947,129	$3,038,765
Total Taxes[1]	$708,792	$618,269	$370,742	$184,754
State and Local Taxes[1]	$241,954	$229,974	$130,894	$58,798
Total Taxes[2]	$707,400	$616,782	$367,290	$184,515
Tax and Non-tax Costs	$3,169,942	$4,082,357	$4,314,419	$3,223,280
Standard Deviations				
Costs: Non-tax	$57,616	$65,151	$67,732	$55,365
Taxes[1]	$45,651	$37,534	$17,991	$8,209
Tax Dev. as % of Cost Dev.	79.2%	57.6%	26.6%	14.8%
Tax Dev. as % of Total Taxes	6.4%	6.1%	4.9%	4.4%

[1] Tax calculations assume that costs are constant across states.

[2] Tax calculations incorporate interaction between costs and taxes.

Source: IPPBR Tax Simulation Model.

In order for taxes to influence the location of investment, two conditions are necessary. First, taxes must have a significant impact on a firm's after-tax profit. For the firms considered in this study, taxes are generally of the same magnitude as profits; thus the first condition holds. Second, taxes must vary significantly among the alternative locations under consideration. The simulation model provides estimates of tax variations and compares them with cost variations in order to gauge their importance.

Table 8 presents estimates of the standard deviation of taxes and costs in the six state study region.[12] The standard deviation is a measure of the average distance between a state's taxes or costs and the regional average. For all of the industries examined in this article, interstate differences in basic business costs exceed differences in taxation.[13] On the average, interstate tax differences are small: 13 to 19 percent of state and local taxes, and 3 to 6 percent of total taxes. In only one case, that of an established electronics firm, does the magnitude of the tax variation approach the magnitude of the cost variation. The results of the model suggest that cost differences among states will be more influential than tax differences for firms considering investment in the region.

In the established firm case, the standard deviation in taxes varies directly with the capital intensity of the firm, suggesting that differences in property tax rates and bases across the states explain a significant share of the total tax variation in the region.

The data in Table 8 can also be used to make comparisons between new and established firms. The standard deviations of basic business costs are very similar in the two cases, due to the assumptions on which the model is based. However, the standard deviation of taxes is smaller for the new firm case than for the established firm case for all of the manufacturing industries. The tendency is still seen when taxes are measured as a percentage of the regional average tax. In their efforts to attract investment, states have generally attempted to match any tax advantages offered by their neighbors; therefore, for

Table 9
Tax Changes Required for Kansas Neutrality and Competitiveness

	Electronics	Fab. Metals	Plastics	Data Proc.
New Firms				
Change to Match Regional Average	$49,708	$59,747	$28,631	$14,382
% of Current State and Local Taxes	41.5%	47.5%	35.6%	22.7%
Change to Match Lowest State	-$14,564	-$16,452	-$73,240	-$45,726
% of Current State and Local Taxes	-12.2%	-13.1%	-91.0%	-72.0%
Established Firms				
Change to Match Regional Average	-$48,185	-$23,407	-$21,719	$9,523
% of Current State and Local Taxes	-15.4%	-8.2%	-12.5%	12.8%
Change to Match Lowest State	-$88,761	-$74,758	-$102,800	-$42,458
% of Current State and Local Taxes	-28.3%	-26.3%	-58.9%	-56.9%

Notes: The minus sign indicates that a tax decrease is required. Regional averages are calculated excluding Kansas. In each case, Missouri has the lowest overall taxes plus basic costs.
Source: IPPBR Tax Simulation Model

new firms, the levels of business taxation within the region have become more alike.

Example 4: How much could changes in Kansas taxes improve the competitiveness of Kansas locations? Kansas maintains the goal of removing barriers to investment and employment. With this goal, it is reasonable to pursue a strategy of creating a business climate in which overall taxes plus costs are average for the region. This strategy of *neutrality* positions the state to compete for business on the basis of other benefits it can offer: education, quality of life, access to markets, and productivity.

Table 9 shows that for new firms receiving all available tax incentives, taxes plus costs fall below the regional average. Since in practice many communities offer only partial tax abatements, the cost and tax climate in Kansas is probably very close to neutral.

For mature manufacturing firms, Kansas locations face some competitive disadvantages which might discourage new investment in the future. Tax cuts on the order of 8 to 15 percent would be necessary to achieve neutrality.

The simulation model also shows the size of tax cuts which would be necessary for Kansas to become the lowest bottom line state. This would require tax breaks to offset any disadvantage in either taxes or basic costs. In most cases, the cuts would be very large. Furthermore, in order to achieve a total tax reduction of one dollar, state and local governments must reduce taxes by more than one dollar because of the federal offset factor. Given the differences in basic business costs as well as taxes which exist throughout the region, it would be politically infeasible for Kansas to try to compete for business on the basis of taxes alone.

Conclusions

This article has examined state and local business taxation in the region surrounding Kansas from several perspectives. A survey of state taxation reveals that each state employs a unique combination of tax rates, tax bases, and tax incentives, factors which interact in a complex manner to determine the actual taxes a firm will pay.

The simulation model presented in the article is designed to capture complex interactions and is used to examine several questions of potential interest to policy makers. The model shows a striking difference between competitive situations of new firms versus established firms regarding business taxes. Kansas locations offer new businesses a tax climate which is neutral to slightly favorable; in contrast, mature firms located in the state face business taxes, particularly property taxes, which are high for the region.

An extended version of the model examines business taxes in the context of other business costs. From this perspective, it appears that tax differences among the states in the study region are significantly smaller than differences in basic costs such as land and labor. Even if taxes are important to business decision-makers, they are likely to be less important than other cost factors. For state and local policy makers in Kansas, efforts to attract new investment on the basis of tax breaks alone will probably prove unsuccessful.

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Notes

1. Anthony Redwood and Charles Krider, *Executive Report, Kansas Economic Development Study: Findings, Strategy, and Recommendations*, Report No. 108. Lawrence, Kansas: Institute for Public Policy and Business Research, June, 1986.

2. IPPBR completed the original study for Kansas Inc. in 1988 and the updated study in 1990. Results from the original study can be found in Pat Oslund, "Business Taxes in Kansas and Nearby States," *Kansas Business Review*, 11, No.4 (1988), 1-14.

3. Two good surveys of the literature are Joseph L. Bast, John H. Beck, Robert J. Genetski, Richard C. Rue, and John W. Skorburg, *Coming Out of the Ice: A Plan to Make the 1990s Illinois' Decade*. Chicago: Heartland Institute, 1989; and Roger Wilson, *State Business Incentives and Economic Growth: Are They Effective? A Review of the Literature*, Economic Development in the States, vol.1. Lexington, Kentucky: Council of State Governments, 1989.

4. Bast, *Coming Out of the Ice*, p. 20.

5. Donald Steinnes, "Business Climate, Tax Incentives, and Regional Economic Development," *Growth and Change*, 15, no.2 (1984), 38-47.

6. Leslie E. Papke, *The Influence of Interstate Tax Differentials on the Birth of New Firms: Estimates of a Poisson Process*, Center for Tax Policy Studies Paper no. 9. West Lafayette, Indiana: Purdue University, November 1986.

7. John P. Blair and Robert Premus, "Major Factors in Industrial Location: A Review," *Economic Development Quarterly*, 1, No.1 (1987), 72-85.

8. Oslund, *Business Taxes*, p. 12.

9. The complete report of the IPPBR/Kansas Inc. tax project contains details of the tax incentive plans of each state. See Pat Oslund, *Business Taxes in Kansas and Nearby States*. Lawrence, Kansas: Institute for Public Policy and Business Research, forthcoming.

10. Data were compiled from "The Geo-Corporate Index," *Site Selection and Industrial Development*, 34, no.1 (1989), 58-257.

11. An exception is the case of industrial revenue bond financing. Kansas state law allows property financed with IRBs to be exempt from local property taxes for up to ten years.

12. The standard deviation is defined by the following formula:

$$\sqrt{\sum_{states} \frac{(state-regional\ av.)^2}{number\ of\ states}}$$

13. Standard deviations have been calculated for the case which assumes no interaction of taxes and costs. This case measures the deviations in taxes due to tax structure alone.

The Economic Effects of the 1989 Increase in the Kansas Gasoline Tax

Robert Glass
David Rearden
with David Burress

Robert Glass is a research associate, David Rearden is a research assistant at the Institute for Public Policy and Business Research, and Dr. Burress is an assistant professor in the economics department at the University of Kansas and a research associate at the Institute for Public Policy and Business Research.

> "Targeted taxes force voters and lawmakers to take account of the price tags of programs they favor, just like a consumer at a store."
> Michael J. Mandel in
> "Aiming Taxes Straight at Their Targets," *Business Week*, July 2, 1990, p. 62.

Introduction

In 1989 the Kansas Governor and Legislature agreed upon a gasoline tax increase directed at providing more revenue for the maintenance and improvement of the state's highway system. What is the price tag of this program? How will the tax increase affect the Kansas economy? This paper is a response to these two questions.

Because this paper only analyzes the cost side of the cost benefit paridigm, a third and most important question, "Are improved highways worth the cost?" is not directly answered; however, a partial answer can be given. If the benefits of the highway program are equivalent to the tax revenue generated to pay for it, then Kansans will be better off as a result of the tax increase/highway improvement program. Specifically, we found the net loss of income to Kansans of the first stage of the tax increase would be 69% of the tax revenue raised. So for Kansans to break even on the tax increase/highway improvement program, the highway improvement only needs to generate benefits worth 69% of its cost in tax dollars.

Before any of the wider questions concerning the gasoline tax increase can be answered, the effect of the tax increase on the Kansas gasoline market must be determined. We estimated this effect using an econometric model. The only unusual problem confronted during this phase of the research was the tax disparity between Kansas and Missouri. The increase in the Kansas gasoline tax made it greater than the Missouri gasoline tax. We found that the substitution of Missouri gasoline for Kansas gasoline, as a result of the tax increase, was statistically significant.

To estimate the total impact of the tax

increase on the Kansas economy, we used our calculation of the effect of the tax increase on the Kansas gasoline market to estimate the effect of the tax increase on state tax revenue; in other words, we estimated the price tag of the tax increase. Next we estimated the effect of the tax increase on gasoline wholesalers and retailers and on the incomes of gasoline consumers; then, utilizing multipliers from a Kansas Input-Output Model, we approximated the secondary effects of the tax increase on the Kansas economy. Combining these secondary effects with the primary effects described above provides a picture of how the tax increase will affect the Kansas economy. To fully evaluate the tax increase/highway improvement program, some measure of the benefits derived from the highway improvement is necessary; unfortunately a measure of these benefits will not be feasible for some time.

The rest of this paper is an elaboration of the research agenda just outlined. First, we examine the problems caused by a tax disparity between two adjacent taxing entities. Second, we study the econometric analysis of the effect of the tax increase on the Kansas gasoline market. Third, we present the calculation of the total impact of the tax increase on the Kansas economy. Finally, we furnish a summary list of our conclusions.

The "Border Tax Problem"

Because Missouri now taxes gasoline at Kansas' previous rate of 11¢ a gallon, the 1989 increase in the Kansas gasoline tax established a 4¢ disparity between the states. This disparity created, for Kansas residents close to the Missouri border, the possibility of substituting a cheaper Missouri gasoline for Kansas gasoline. In the economics literature this situation is known as the "border tax problem."

Eisler (1989), in the broader context of the sales tax, provides an extreme but interesting and illuminating example of the impact of such a phenomenon. Washington State has a high sales tax and no income tax, while Oregon has a high income tax and no sales tax. The sales tax in Seattle is 8.1% while Portland, Oregon is the largest U.S. city with no sales tax. Eisler reports that Seattle has 18% more money to spend per capita than Portland, yet Portland retailers received 69% more per capita expenditures on general merchandise than Seattle.

The "border tax problem" has inspired abundant theoretical and empirical work. Mintz and Tulkens (1986), in the introduction to their article, provide a guide to the theoretical literature. The empirical research is concerned primarily with sales tax differentials between regions. The preponderance of evidence indicates that sales tax rate differentials affect relative retail sales activity, and that the larger the differential and the closer the alternative shopping possibilities are, the greater the effect. Table 1 summarizes the empirical results of the major studies of sales tax rate differentials,[1] which indicate that a 1% retail sales tax differential in a border region can lead to a reduction in sales for the higher tax area of between ½% and 11%.

These figures overestimate the effect of a gasoline tax rate differential because gasoline represents a much smaller portion of the ordinary household budget than sales-taxable items. For example, it is relatively easy to imagine someone traveling from Seattle to Portland to save hundreds of dollars when purchasing an expensive durable good, but is difficult to imagine many consumers traveling 200 miles to save 8¢ per gallon on gasoline. The sales tax rate differential literature provides an upper bound on the magnitude of the effect we would expect from a gasoline tax rate differential.

No study was found investigating the "border tax problem" for gasoline taxes or for any other special excise tax; however, from anecdotal evidence it is clear that excise tax rate differentials can create economic problems.[2] For example, tax rate differentials for cigarette taxes have generated problems with bootlegging of cigarettes when the disparities between state cigarette taxes have grown large. Warner (1982) points out that "Due to its clandestine nature, the magnitude of cigarette bootlegging can only be estimated roughly, but all reasoned estimates place it in the hundreds of millions of dollars per year in the mid-1970's" (p. 483).

Econometric Analysis of the Gasoline Tax Increase

On July 1, 1989 the first phase of the gasoline tax increase went into effect, increasing the Kansas gasoline tax by 4¢; the rest of the tax increase will come in

Table 1
Summary of Estimated Border Tax Effects on Retail Sales

Author	Year	Percent Reduction in Sales per 1% Tax Differential
Mikesell	1970	1.69% to 10.97%
Fisher	1980	7.17% for food, statistically insignificant for all commodities and apparel
Fox	1986	0.44% to 3.73%
Mikesell & Zorn	1986	3.07%
Walsh & Jones	1988	5.88% for grocery stores

1¢ increments on July 1 of 1990, 1991, and 1992. Only the first 4¢ tax increase will be investigated in this paper, and we have chosen an econometric model to estimate the effect of the tax changes on the Kansas gasoline market.

Most econometric analysis of gasoline markets has estimated a single equation representing gasoline demand,[3] but we have used a two equation, supply and demand model to take into account supply shocks to the gasoline market. We determined that the tax disparity between Kansas and Missouri has a statistically significant effect on the demand for taxable Kansas gasoline; then, by running simulations with our estimated model, we approximated the short-run effect of a 4¢ increase in the gasoline tax.

The Model

The model we have chosen to use is a short-run, supply and demand adjustment model, and we used only time series data. The equations are estimated simultaneously using the two-stage least-squares technique. Both equations are in logarithmic form, except for the dummy variable for seasonal adjustment and the time trend.

The demand equation (1) is similar to many gasoline demand equations in the literature. Personal income is used to capture both the increases in Kansas population and per capita personal income, neither of which is available on a quarterly basis, but both would be expected to increase the demand for Kansas gasoline. Both the state and federal gasoline taxes are added to the pre-tax price in the demand equation to give the pump price paid by consumers; however, it is the pre-tax price that is the equilibrium price in the model and not the pump price. The demand equation also includes a variable to capture the effect of the disparity between Kansas and Missouri tax rates. The variable is simply one plus the difference between the Kansas tax rate and the Missouri tax rate. The addition of the one is due to the logarithmic structure of the model. Since for several quarters Kansas and Missouri had the same tax rate, and since the logarithm of zero is undefined, the inclusion of the one causes the variable to take the value of zero when there is no difference in the tax rates. The demand equation also has a dummy variable to take account of seasonal variations in the demand for gasoline in the spring and summer.

The supply equation (2) has the price of crude oil to capture the supply shocks which have affected the national gasoline market over the period used for estimation. A time trend was added to each equation to take account of the persistent trends in the data.

Our model is specified as follows with gas_t and $price_t$ as the two endogenous variables:

Demand Equation

$$(1)\quad \ln(gas_t) = \alpha_1 \ln(income_t) + \alpha_2 \ln(price_t + statetax_t + fedtax_t) + \alpha_3 \ln(1 + taxdiff_t) + \alpha_4 season_t + \alpha_5 time + \varepsilon_t$$

Supply Equation

$$(2)\quad \ln(price_t) = \beta_1 \ln(crudeprice_t) + \beta_2 \ln(gas_t) + \beta_3 time_t + \eta_t.$$

Gas_t is taxable Kansas gasoline sales in Kansas; $income_t$ is Kansas personal income; $price_t$ is the pre-tax, retail price of gasoline in Kansas City; $statetax_t$ is the Kansas tax per gallon of gasoline; $fedtax_t$ is the federal tax per gallon; $taxdiff_t$ is the difference between the Kansas and Missouri gasoline tax rates; $season_t$ is a seasonal dummy variable for the spring and summer quarters; $crudeprice_t$ is the average price of crude oil at the wellhead; and $time_t$ is a time trend.[4] Prices, income and taxes were inflated to the fourth quarter 1989 price level using the Kansas City consumer price index for all urban workers.[5] The unobserved disturbance terms are ε_t in the demand equation and η_t in the supply equation.

The Results

Table 2
Results of Two Stage Least Squares Estimation

	Demand Equation (gallons)	Supply Equation (price)
Spring & Summer	-0.0661	--
	(5.11)*	--
Income	0.6252	--
	(33.26)	--
Crude Oil Price	--	0.5808
	--	(22.35)
Price	-0.1332	--
	(3.45)	--
Gallons	--	0.5293
	--	(35.87)
Tax Difference	-0.0232	--
	(2.02)	--
Time Trend	-0.0062	-0.0065
	(10.85)	(10.18)

* The figure in parentheses is the absolute value of the t statistic for each parameter.

Table 2 provides two-stage least-squares estimates of the coefficients of the demand and supply equations. All of the estimated coefficients have the expected sign and are statistically significant.[6] The relatively large coefficient for personal income (personal income is measured in millions of dollars and is always a five digit number during the period of estimation) indicates the pressure that growth puts on gasoline demand. The own-price elasticity of demand is -0.1332, indicating a highly inelastic demand curve, as one would expect with a short-run model.[7] The own-price elasticity of supply is an elastic 1.8893. The fact that the coefficient on the price of crude oil is about 0.6 suggests that in the short run, Kansans are not subjected to the full impact of oil price shocks. On the other hand, when the price of crude oil falls in the short run, as it has this spring, only part of that relative drop in price will be felt in Kansas pump prices.

In both the supply and demand curve the time trend had a negative sign. In the supply curve this seems to represent the efficiency improvements in the refining industry. After the first oil price shock in 1974, the oil industry built new, more efficient refineries; after the oil price shock of the Iran-Iraq War, the oil companies closed older refineries which had become inefficient because of the price shock. In particular, several refineries in Kansas were closed. The time trend in the demand curve seems to reflect the gradual improvement in the gasoline efficiency of automobiles over the past 15 years. This trend is strong enough that if the time variable is left out of the demand equation, then the coefficient on personal income switches signs but remains statistically significant.

The tax difference is statistically significant but, due to the logarithmic structure of the model, determining the relative magnitude of the effect of the tax disparity on price and quantity of gasoline consumed is difficult. The logarithmic structure also makes analytically solving the model impossible and further analytic examination nearly useless.

The model can be investigated using simulations, however. The simulations were run using 1989 values for the exogenous variables with only the Kansas and Missouri tax rates varied. The first part of Table 3 contains the actual quarterly data for 1989, an annual average price, and annual total consumption of taxable Kansas gasoline. The next part of the table contains the model's simulation of 1989 with the actual tax rates for the year (the tax rate changed July 1, 1989), providing another measure of the model's reliability. As one can see from the table, some difference exists between the simulations and the actual data, but the simulations are relatively close.

The remaining portion of Table 3 has three simulations: 1989 simulated with an 11¢ Kansas gasoline tax, 1989 simulated with a 15¢ Kansas gasoline tax, and 1989 simulated with a 15¢ Kansas gasoline tax and no difference between the Kansas and Missouri tax rates. The first two simulations capture the effect of the tax increase. Figure 1 illustrates graphically the effect of the tax increase as a shift of the demand curve to the left. Since the Kansas and Missouri gasoline taxes only enter the demand curve, they can shift that curve. The shift in the demand causes the quantity demanded to drop from 1236.3 mil. gallons to 1186.5 mil. gallons and the pre-tax price of gasoline to fall from 73.0¢ to 71.5¢.

The approximate effect of the tax disparity is captured by comparing the last two simulations: one with the tax increase and the tax disparity and the other with the tax increase but with Missouri's gasoline tax rate arbitrarily raised to the Kansas rate. When the tax disparity between Kansas and Missouri is eliminated, the quantity demanded falls slightly to 1229.6 mil. gallons and the pre-tax price falls only to 72.9¢.

These last three simulations demonstrate the relative importance of the tax disparity in our model. The tax disparity accounts for 83.5% of the drop in the demand for taxable Kansas gasoline and nearly all of the drop in pre-tax price.[8] These results suggest that the tax increase's primary effect on Kansas consumers is their substitution of Missouri gasoline for Kansas gasoline. If no tax difference existed between the two states, then consumers would absorb nearly all of the tax increase; however, because of the tax disparity, consumers absorb only 2.5¢ of the tax increase while wholesalers and retailers absorb 1.5¢ of the tax.[9]

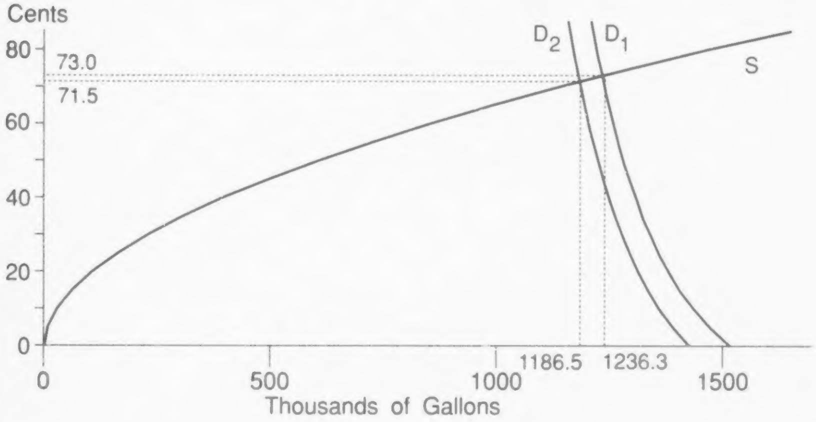
Table 3
Results of Model Simulations

	1989Q1	**1989Q2**	**1989Q3**	**1989Q4**	**Annual***
Actual Data**					
Price (¢)	71.1	86.5	79.6	72.9	77.7
Gallons (mil.)	296.9	324.0	312.8	308.3	1242.0
Simulations					
With Actual Tax Rate:					
Price	69.8	77.0	71.8	70.8	72.4
Gallons	301.6	318.8	307.3	288.2	1215.9
With 11¢ Gas Tax:					
Price	69.8	77.0	72.8	72.3	73.0
Gallons	301.6	318.8	315.7	300.2	1236.3
With 15¢ Gas Tax:					
Price	68.2	75.4	71.3	70.8	71.5
Gallons	289.3	306.0	303.0	288.2	1186.5
With 15¢ Gas Tax -- Tax Disparity eliminated:					
Price	69.6	76.8	72.7	72.2	72.9
Gallons	299.9	317.1	314.0	298.6	1229.6

* Annual gallons are the sum of the four quarters gallons. Annual price is price multiplied by gallons for each quarter, summed and then divided by total gallons.

** Prices are in cents and inflated to the fourth quarter 1989 price level. Gallons are millions of gallons of gasoline.

Figure 1
Shift in Demand as a Result of Tax Increase



Finally, several different formulations of the model were tried, but none of them, including the one above, proved to be robust to changes in variables or to alterations in the period of estimation; however, a linear version provided similar results to the logarithmic version of the model used.

The Impact of the Gasoline Tax Increase

As the economic environment adapts to the tax change, more economic agents are affected. Consumer spending behavior is altered because of the price change due to the tax increase; wholesalers and retailers of gasoline will also be affected. The state government will have more revenue to spend for maintenance and improvement of highways. Eventually the disruption created by the tax increase spreads throughout the whole economy.

We will use two steps to estimate the disruption to the Kansas economy caused by the tax increase. First, we will approximate the effect of the tax increase on Kansas consumers, state government, and gasoline wholesalers and retailers, using the results of our simulations from the estimated economic model. Second, we will use multipliers to estimate the total effect (the direct effect plus the indirect effects) of the tax increase after it has swept through the Kansas economy.

Direct Effects

Our simulations shown in Table 3 indicate that with an 11¢ Kansas gasoline tax the pre-tax price of Kansas gasoline is 73.0¢. By adding the Kansas tax and the 9¢ federal tax to this price we arrive at a pump price of 93¢ for 1,236.3 mil. gallons of taxable gasoline; with a 15¢ Kansas tax rate, the pre-tax price is 71.5¢ or a pump price of 95.5¢ for 1186.5 mil. gallons. Multiplying the pump price by the quantity of gasoline gives the total amount spent on Kansas taxable gasoline for the different tax rates. The results of these calculations can be found in Table 4. This does not take into account all of the changes in Kansas consumer spending on gasoline due to the increase in the gasoline tax: because of the higher tax rate in Kansas, Kansas consumers substitute the purchase of Missouri gasoline for Kansas gasoline, and the figures in Table 3 indicate that 43.1 mil. gallons of Missouri gasoline are purchased. To get a revenue figure for these purchases we will assume that the pump price in Missouri is the same as in Kansas when the tax was at 11¢, resulting in $40.1 mil. spent by Kansas consumers on Missouri gasoline because of the tax disparity. The net result for Kansas consumers is that they spent $23.4 mil. more on gasoline after the tax increase than before the tax increase. As is expected, the tax increase adds to state government revenue. With an 11¢ tax rate, 1236.3 mil. gallons are purchased yielding tax revenue of $136.0 mil; with a 15¢ tax rate, 1186.5 mil. gallons are purchased yielding tax revenue of $178.0 mil. The tax increase adds $42.0 mil. to the state's treasury.

In Table 4 we calculate that consumers would purchase $1149.8 mil. worth of Kansas taxable gasoline with an 11¢ tax rate and $1133.1 mil. worth of taxable Kansas gasoline with a 15¢ tax rate--a drop of $16.7 mil. in revenue to Kansas gasoline retailers. The state gasoline tax revenue will increase $42.0 mil. with the 15¢ tax rate. Clearly, Kansas gasoline retailers are going to have $58.7 mil. less revenue as a result of the tax increase. This figure represents the total decline in sales at the retail level throughout all of Kansas, not just the border counties affected by interstate competition. The decline in revenue in the border counties cannot be more than $58.7 mil. and would certainly be less; therefore, $58.7 mil. represents the upper bound of the revenue loss for Kansas gasoline retailers in border counties due to the increased gasoline tax.

Because of the nature of wholesale and retail trade, not all of the decline in revenue will result in less income to the wholesaler and retailer; some of the decline in income will be passed back to the refiner and transporter of gasoline. At the national level, the average trade margin[10] for gasoline (wholesale and retail combined) is 30.7%, with nearly all of the rest of the cost assumed by the refiner and producer of crude oil products. If the refiner of the gasoline sold in Kansas is outside the state, then that portion of the decline in gasoline demand which affects the refiner does not affect a Kansas business. Even if a refiner is in Kansas, the market for refined petroleum products is a competitive national market and the decline in Kansas gasoline demand (of 49.8 mil. gallons) will have little or no influence on profits at the national level. In either case it seems more appropriate to ignore the refiner and analyze only the effect on Kansas wholesalers and retailers of gasoline; therefore, we are assuming that the portion of the effect of the tax increase which is passed back to refiners and producers of petroleum products does not affect the Kansas business community, and as a consequence, is exported--paid by someone other than a Kansan. The tax increase will also increase the trade margin from 30.7% to 32.1%. Based on these assumptions, the loss of revenue to the Kansas wholesalers and retailers is $18.8 mil. The accounting for all of the direct effects mentioned in this section can be found in Table 4.

Indirect Effects

As these direct effects of the gasoline tax and the corresponding government expenditures develop, they produce further effects in the economy of the state. We will estimate the indirect effects using multipliers from the Kansas Long Term Model.[11] Our result is conceptually similar to a cost benefit analysis, but differs in the following three respects:

1. We will neglect the effects taking place in other states, addressing only the effects within Kansas.
2. We will neglect the excess burden of the gasoline tax; however, most studies have found the excess burdens resulting from small increases in an excise tax to be a relatively small fraction of revenues. (For example, see Rosen, 1978.)
3. We will not try to measure the benefits of the improved highway system as a result of the increased expenditure.

We will treat the extra consumer expenditure for gasoline as a loss in real income to consumers. By multiplying the increase in consumer expenditures for gasoline due to the tax increase by the multiplier for changes in exogenous income,[12] we estimate the total effect of the loss in consumer purchasing power as a result of the tax increase as $35.1 mil. Next, by multiplying the increase in state government revenues by the income/ export multiplier for construction, we estimate the total effect on Kansas personal income of the increased state government revenue as $18.5 mil. Finally, by multiplying the loss of revenue to wholesalers and retailers by the income/export multiplier for wholesale and retail trade, we estimate the total effect of the loss in wholesale and retail revenue as $12.4 mil. The accounting for these indirect effects also can be found in Table 4.

The complete income effect in Kansas of the gasoline tax increase is found by subtracting the total effect of the impact on consumers and wholesalers and retailers from the total effect of the increase in state governmental revenues. The total income effect of the tax program is a loss of $29.1 mil. in real Kansas personal income. The net loss in real personal income due to the tax increase is about 69% of the $42.0 mil. increase in state tax revenues because of the tax increase. The net loss of $29.1 mil. in real personal income does not completely capture the value to the tax increase/highway improvement program. What has not been considered is the value of the improved highway system put in place as a result of the tax increase.[13]

Table 4
The Impact of a Four Cent Increase in the Kansas Gasoline Tax (in millions of fourth quarter, 1989 dollars)

Direct Effects	
Consumers	
Consumption of gasoline with 11¢ tax	$1149.8
Consumption of gasoline with 15¢ tax	1133.1
Substitution of purchases of Missouri gasoline for Kansas	40.1
Increase in Kansas consumer's dollars spent on gasoline with 15¢ tax	23.4
State Government Revenue	
Government revenue with 11¢ tax	136.0
Government revenue with 15¢ tax	178.0
Increase in Government revenue due to tax increase	42.0
Gasoline Retailers	
Loss of revenue to gasoline retailers	58.7
Loss of income to Kansas retailers	18.8
The Total Effects	
Total income loss due to consumer loss of purchasing power	35.1
Total income gain due to increase tax revenues	18.5
Total income loss due to retailers	12.4
Net total income loss due to gasoline tax increase	**29.1**

Conclusion

The major results of our investigation of the increase in the Kansas gasoline tax from 11¢ to 15¢ are:

1. The tax increase will raise the pump price and lower the quantity of taxable Kansas gasoline consumed.
2. The tax disparity between Kansas and Missouri gasoline tax rates is a statistically significant variable in the demand equation of our model.
3. The tax disparity accounts for 83.5% of the decline in the demand for taxable Kansas gasoline and for nearly all of the decline in the pre-tax price of taxable Kansas gasoline.
4. The tax increase reduces the purchasing power of Kansas consumers of gasoline, reduces the revenue of Kansas gasoline retailers, and increases the state's tax revenue.
5. The net income effect of the tax increase is a reduction in real Kansas personal income of about $29.1 mil., which represents 69% of the tax revenue raised.

Notes

1. For a more detailed survey of this literature, see Glass, Rearden, and Burress (1990).

2. As Bowman and Pratt (1983) point out, "Where motor fuel taxation is the major source of local selective excise tax revenue--Hawaii--the fact that the taxing counties are islands effectively diminishes the border city effect" (p. 189).

3. An enormous amount of scholarly energy has been expended on trying to estimate gasoline demand. Dahl (1986) provides a survey of the more recent literature on gasoline demand in general. The literature survey in Greene (1980) reviews earlier attempts at estimating regional gasoline demand.

4. The Kansas City price was used as an approximation of the Kansas price. The federal tax and the Missouri tax changed only once over the sample period (from the beginning of 1976 till the end of 1989); the Kansas tax changed three times during the same period. For the whole period, the Kansas gasoline tax was greater than or equal to the Missouri gasoline tax. Quarterly dummy variables were tried in both the supply and demand equations to capture seasonal variation, but only spring and summer proved to be of any statistical significance and only in the demand equation.

5. The Kansas City gasoline price data came from various issues of the *Oil and Gas Journal*; Kansas personal income data came from the U.S. Bureau of Economic Analysis. The crude oil price time series was found in various issues of the *Monthly Energy Review* from the U.S. Department of Energy; the taxable sales of Kansas gasoline were provided by the Kansas Department of Revenue.

6. For an explanation of two-stage least squares, consult any standard econometrics book, such as Theil (1971). In Table 2, the figure in parentheses below the parameter value is the t statistic for the parameter. For a sample size of 56, the t statistic needs to be greater than 2.7 percent to reject the hypothesis that the parameter is zero at 1 percent significance level; the t statistic needs to be greater than 2.0 to reject the hypothesis that the parameter is zero at a 5 percent significance level.

7. The own-price elasticity is the percentage change in quantity demanded divided by the percentage change in price. A supply or demand curve is considered inelastic if the absolute value of its elasticity is greater than one. Bowman and Mikesell (1983) estimated the own-price elasticity of taxable Kansas gasoline at -0.345. They used a different time period for the estimate, different data sources, and a single equation model to estimate demand only.

8. Charles Nicolay, executive director of the Kansas Oil Marketers Association, commented: "It depends somewhat on the locality. In cities where gas wars are under way, or where it's extremely competitive, some service stations will absorb the tax increase temporarily. But I would say in all probability, it's true that most of them will pass on the tax increase July 1" (Myers, 1989, p. 1-A).

9. Dan Stevens, manager of public and government affairs for Texaco, in Tulsa, Oklahoma, commented on the tax disparity between Kansas and Missouri: "We price with the market. You'll never see a 4¢ price differential on one side of the line" (Hendricks, 1989, p. 6F). Hendricks had several other quotations indicating the same phenomenon.

10. The trade margin used here is actually a gas tax plus trade margin for the wholesale and retail trade of gasoline at the national level. The trade margin represents the part of total cost of gasoline production and sales which is allocated to wholesalers and retailers. Since we have used a tax plus trade margin, we are over estimating the effect on wholesalers and retailers in Kansas.

11. The multipliers from the Kansas Input-Output model can be found in Burress (1989). The use of the construction income/export multiplier to estimate the total effect of the increase in state governmental revenues is based on the assumption that the additional tax revenue will be used to construct or rebuild highways. The values of the multipliers are 1.5 for exogenous income and 0.44 for construction. Since no income/export multiplier exists for wholesale and retail sales of gasoline in Kansas, we have used the wholesale and retail trade income/export multiplier which has a value of 0.66.

12. Among other things, we are assuming that consumer income is constant so that the increase in consumer expenditures on gasoline results in a decrease in consumer income available for other purchases or savings and investment. With the multiplier, we are trying to measure the effect on the Kansas economy of this reduction in consumer income.

13. There are numerous problems involved in placing a value on improvements in the highway system. Because the highway system is built through government financing rather than through the market system, no market value exists for the system. Trying to impute a market value undervalues the highway system because of the public good aspects of highways. There are additional positive and negative externalities associated with highways which need to be taken into account. A final difficulty subsumes a host of other problems: valuing the highway system is a dynamic problem. A highway built this year does not disappear at the end of the year, but it does depreciate. Besides the question of what is the appropriate depreciation rate for infrastructure, there is also the question of the appropriate discount rate for government financing.

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The Outlook for Kansas and the Nation, 1990

Norman Clifford

Norman Clifford is director of the Kansas Econometric Model and an assistant professor of economics at the University of Kansas. Funding for the Kansas Economic Modeling Program at the Institute is provided by the State of Kansas.

Introduction

In 1990 the national economy will record its slowest rate of growth in 6 years. After two very weak quarters--1989:IV and 1990:I--the economy will gain some overall strength, but growth will still be slow in relation to growth in the previous 5 years. The fastest growing sector of the economy during the year will be exports, due to a lower exchange rate of the dollar and strong economic growth among our major trading partners. Consumer spending, which has been a strength of the economy during the last two years, will soften in 1990 and is expected to be especially weak during the second half of the year, providing very little cushion for shocks that the economy may receive during that period. For the year, growth in consumption of services and durable goods will be relatively strong, but consumer spending on nondurable goods will actually decline slightly. Slower consumer spending growth and the weaker dollar will slow the rate of imports and improve the trade deficit considerably.

Although business spending on equipment will grow more slowly this year than last, the rate of growth of business spending on structures will increase; therefore, nonresidential fixed investment spending will grow at about the same rate as last year. Residential investment will grow slightly after falling last year. The decline of federal government purchases due to a substantial decrease in defense spending, and an increase in state and local government purchases will result in slight growth of total government purchases. Substantial increases in transfer and interest payments will cause total federal expenditures to grow more than total federal receipts, which will be constrained by falling corporate profits tax receipts; the federal deficit will therefore worsen this year.

Inflation will be higher in 1990 as inflationary pressures peak during the early part of the year, although lower wholesale price increases and weaker consumer spending will reduce inflation during the second half of 1990. Prices will increase most rapidly for medical care, services, food and beverages, and apparel; housing and transportation price increases will be moderate. Interest rates will be about the same on average for the year as they were in 1989; however, interest rates fell gradually in 1989, hitting their lowest levels at the end of the year. They are expected to rise gradually during 1990 and reach their highs for the year in the fourth quarter. Because of higher inflation, real returns will be lower this year than last, on average.

Personal income will grow more slowly than last year. Because corporations continue to increase dividends in spite of falling corporate profits and transfer payments will increase due to the sluggishness of the economy, personal income will grow more than GNP, as it did in 1989; however, personal income adjusted for inflation will grow only half as much this year as it did in 1989. The slower personal income growth is one cause of the weakness in consumer spending that is forecasted for the last half of the year. Slower employment growth in 1990 will result in an increase in the national unemployment rate.

Kansas, too, will experience slower growth this year than last. The rate of increase in the number of jobs in Kansas will be only about half of what it was in the last two years and almost all of the growth will come from three sectors: construction, trade, and services. The civilian labor force will grow slightly more rapidly than employment, resulting in a small increase in the Kansas unemployment rate in 1990.

Kansas personal income will jump significantly in 1990, due to a big increase in farm income following the severely depressed year for the Kansas farm economy in 1989. Personal income net of farm proprietors' income will grow at about the same rate as it did in 1989, but adjusted for inflation it will grow only about half as fast as it did that year.These are the qualitative features of the national and Kansas forecasts developed at the Institute for Public Policy and Business Research and presented below.[1]

The national and state forecasts are generated from the following assumptions:

1. The Federal Reserve Board will keep money supply growth (measured as the rate of change of M2) at about 6.0 percent during 1990. M2 growth was 6.3 percent during the first quarter of the year, and it will grow about 5.5 percent during the last three quarters of the year. This growth rate represents an attempt by the Fed to tread a narrow corridor between resisting new inflationary pressures and avoiding a downturn in an economy in which output growth will be very weak during the second half of the year.

2. On the fiscal side, corporate profits tax receipts will be lower than expected by the administration, and the budget deficit will increase. Real defense spending will decline at a 5 percent annual rate. There will be no major changes in other spending or transfer payments.

3. Real economic growth in the OECD[2] countries, our major trading partners, will average 3.5 percent. The rate of inflation for these countries will average 5.2 percent. No adjustments were made to account for developments in Eastern Europe.

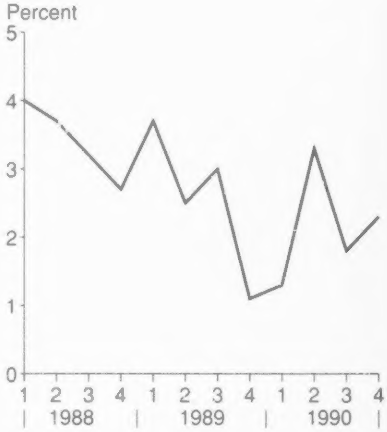
4. Oil prices will stabilize soon and then begin to rise at a 4 percent annual rate.

5. The exchange rate of the dollar,[3] after falling at a 16 percent annual rate during the first quarter of 1990, will fall slightly throughout the rest of the year, dropping 5.8 percent for the year.

The National Economy

National economic growth will be slower in 1990 than it has been for the past 5 years: the forecast is for real gross national product to grow 2.1 percent this year. During the period 1985-1989 the average rate of growth of real GNP was 3.4 percent, with 1986 being the only year during that period when real output grew less than 3 percent (2 percent). However, as the quarterly breakdown of the forecast in Figure 1 shows, the big dip in economic growth took place during the fourth quarter of 1989 and the first quarter of this year, when GNP growth averaged only 1.2 percent. The average growth rate of forecasted real GNP for the last three quarters of the year is 2.5 percent which, while not robust, shows signs of some strength returning to the economy.

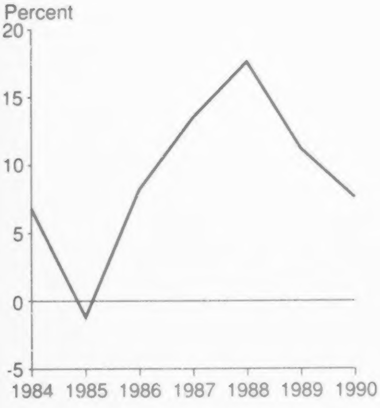
Figure 1
Real GNP Growth



The major strength of the economy in 1990 will be export growth. Figure 2 shows the growth of real U.S. exports from 1984 through 1990. Although the forecasted 7.6 percent rate of growth of exports for 1990 is not as high as the rate of export growth for the previous four years, it will still be the fastest growing major sector of the economy this year, due to a lower exchange rate of the dollar against the currencies of most of our major trading partners, whose own economic growth is strong.

During 1990, the consumption sector of the economy will be just strong enough so that it will not be a brake on the economy. The forecasted rate of growth of real consumption expenditure in 1990 is 2.2 percent--down from 2.8 percent in 1989 and 3.4 percent in 1988--owing to a smaller rate of growth of real disposable income; real disposable income will grow 2.0 percent this year compared to 4.1 percent last year. As Figure 3 shows, one

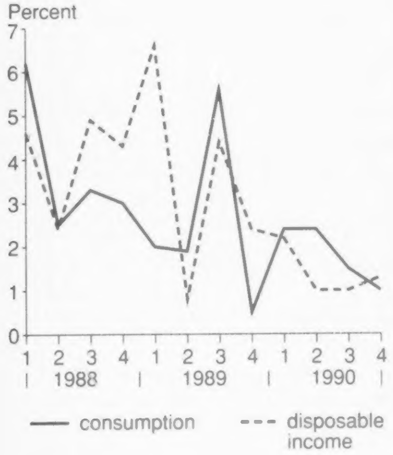
Figure 2
Real Export Growth*



*Growth rate of U.S. exports measured in 1982 dollars.

disturbing feature of the forecast of disposable income and consumption spending is that growth in these two areas will weaken during the second half of the year, causing the economy to be in a vulnerable position during that period, since growth in consumer spending will provide very little buffer for shocks in other areas of the economy.

Figure 3
Real Disposable Personal Income and Consumption Growth



The strongest consumption growth will occur in the services sector, where real consumer spending will increase 3.8 percent and account for about five-sixths of the growth in consumer spending. Real consumer spending on durable goods will also be strong in 1990, growing 3.1 percent. Consumer spending on motor vehicles and parts will increase 1.9 percent, despite a 1.2 percent drop in sales of new automobiles, while consumer spending on furniture and household equipment will be the strongest area of spending on durable goods, growing 4.7 percent. Real consumer spending on nondurable goods will decrease by 0.4 percent in 1990, and expenditures in food (-0.9 percent), gasoline and oil (-2.1) percent, and fuel oil and coal (-12.8 percent) will all decline during the year. Consumer expenditures on clothing will increase 1.2 percent.

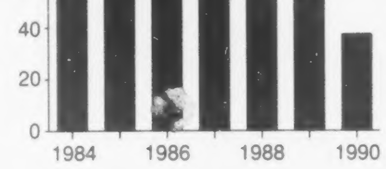
One of the effects of the slower growth of consumer spending in 1990, reinforced by a weakening of the dollar, will be a reduced rate of growth of imports. Real U.S. imports will grow only 4.7 percent this year, compared to 6.1 percent in 1989 and an average 8.2 percent annual growth during the years 1984 to 1989. With exports growing almost 3 percent faster than imports in 1990, there will be a significant improvement in the U.S. balance of trade for the fourth consecutive year. The forecasted trade deficit using the national income and product accounts basis is expected to fall from $53 billion in 1989 to $38 billion; Figure 4 shows that measure of the trade deficit from 1984 to 1990.

Business investment spending, like consumer spending, will grow only slightly faster than the economy as a whole; its 3.3 percent growth in 1990 will be identical to 1989, in contrast to 1988 when a large part of the 4.4 percent growth of the national economy was due to the 8.4 percent rate of growth in business investment spending. Unlike 1989, when all of the growth in business investment was due to growth in spending on equipment (spending on structures actually declined by 1.8 percent), 1990 growth in business investment spending will be balanced, with spending on equipment growing 3.2 percent and spending on structures growing 3.7 percent. Residential investment spending, on the other hand, will grow only 1.3 percent, after declining 2.9 percent last year.

The final major category of spending on gross national product--government purchases of goods and services--will grow only 1.3 percent, following a 2.7 percent rate of growth in 1989, due to a 1.8 percent decline in total federal government purchases which grew 2.5 percent in 1989. This decline will largely be due to a second straight year of substantial decreases in defense spending. Real defense spending fell 1.9 percent in 1989 and will fall another 2.2 percent this year, while nondefense purchases will fall a modest 0.3 percent after growing nearly 20 percent last year. State and local government purchases will grow 3.5 percent, up from 1989's 2.9 percent growth.

The federal government's budget deficit will increase in 1990, as increases in expenditures, due to a 10.0 percent increase in transfer payments and a 9.3 percent increase in interest payments, will not be fully covered by the increase in receipts. Total federal government receipts will increase 6.0 percent as personal tax

Figure 4
Real Net Exports*



*Imports less exports, NIPA basis.

collections increase 6.8 percent, but corporate profits tax collections will decrease 5.3 percent. The federal government's budget deficit will grow from $149 billion in calendar year 1989 to $165 billion in calendar year 1990.

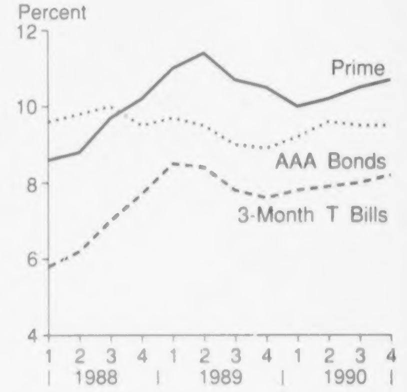
In spite of slower economic growth, the effects of strong inflationary pressures will continue to be felt. By any of the three price measures that we forecast--Gross National Product, consumption spending, and the consumer price index--inflation will be higher in 1990 than it was in 1989. The rate of inflation as measured by the change in the implicit GNP deflator will be 4.6 percent, compared to 4.2 percent in 1989; as measured by the implicit deflator for consumption spending it will be 5.5 percent, compared to 4.4 percent in 1989; and as measured by the consumer price index for all urban consumers it will be 6.2 percent, compared to 4.8 percent in 1989. The consumer price index increase will be above 8 percent at annual rates in each of the first two quarters of this year; the rate of increase will slow somewhat during the last half of the year, as lower wholesale price increases and weaker consumer spending reduce inflationary pressures.

Among the fastest growing areas of consumer prices will be medical care (8.8 percent), services other than entertainment (7.7 percent), food and beverages (7.4 percent), and apparel and upkeep (6.5 percent). Smaller than average price increases will be seen in the cost of housing (5.5 percent) with the cost of shelter increasing 5.5 percent, fuel and utilities prices increasing 3.3 percent, and the cost of household furnishings and operations increasing 2.1 percent. Transportation costs will also increase less than average at 5.3 percent, in spite of a 7.4 percent increase in the price of motor fuel; new car prices will increase 4.1 percent. Entertainment prices will increase 5.1 percent.

On the one hand, continuing evidence of inflationary pressures will cause the Fed to continue its commitment to monetary restraint; on the other hand, the lack of strength in the economy, especially the weakness in consumer spending during the latter half of the year, means that the Fed will be reluctant to apply the brakes to the economy. We expect the M2 measure of the money supply to average 6.0 percent growth for the year, slightly less than the average over the last three quarters. Although this is significantly faster than last year's 3.7 percent M2 growth, interest rates in 1990 will be very close to their 1989 levels as increased inflation works to keep nominal interest rates high; for example the three-month treasury bill rate will average 8.0 percent for the year, compared to 8.1 percent during 1989. If we define the real interest rate to be the nominal interest rate less the rate of inflation, we find that the real interest rate on three-month treasury bills averaged about 3.9 percent in 1989 and is forecasted to average only 1.6 percent in 1990; therefore, the increased rate of money growth will work to bring down real, but not nominal, rates. Figure 5 indicates that the treasury bill rate declined throughout 1989, to a low of 7.6 percent in the fourth quarter, and the forecast is for that rate to increase throughout 1990, ending the year at 8.2 percent, about 0.6 percentage points higher than it ended 1989. As Figure 5 also indicates, the prime rate will also increase during 1990: it will average 10.3 percent for the year, compared to 10.9 percent in 1989. Moody's AAA bond rate will average 9.4 percent, compared to 9.3 percent in 1989.

Given the forecast of sluggish output growth for 1990, it is not surprising that the forecast for personal income growth is for a significant reduction in the rate of growth. Personal income in current dollars will grow 7.7 percent in 1990 compared to 8.9 percent in 1989; given the expected increase in the rate of inflation in 1990, however, the contrast is more severe if we compare real personal income growth. Using the implicit deflator for the consumption sector of GNP to deflate the personal income figures, we find that real personal income grew 4.4 percent in 1989 compared to a forecasted growth of only 2.1 percent in 1990. Real personal disposable income, the income measure that is most directly related to consumer spending, is expected to grow 2.0 percent in 1990, compared to 4.1 percent in 1989.

Figure 5
Interest Rates



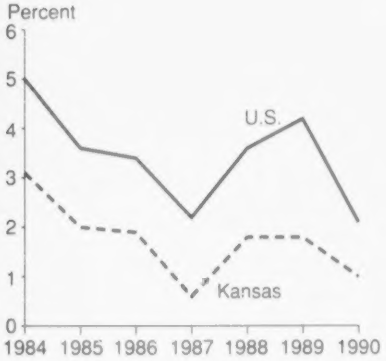
It is interesting to note that personal income will grow more rapidly than GNP in 1990, just as it did in 1989. The 8.9 percent growth rate in 1989 was about 1.7 percentage points more than the growth rate of nominal GNP; in 1990 the growth rate of personal income will be about 1.0 percentage points greater than the 6.8 percent rate of growth in nominal GNP. Most of the difference in both years can be explained by falling corporate profits coupled with growing dividend payments. Corporate profits fell 8.3 percent in 1989 and are forecasted to fall another 6.1 percent in 1990; personal dividend income grew 10.1 percent in 1989 and is expected to grow 7.8 percent this year. Since corporate profits are included in calculating GNP and personal dividend income is included in calculating personal income, personal income is seen to grow more quickly than GNP in the two years. A second reason for faster personal income growth in 1990 is that as the economy slows down transfer income grows: the forecast calls for a 10.3 percent increase in transfer payments, which also adds to the discrepancy between output growth and personal income growth. Figure 6 shows the growth path of U.S. and Kansas personal income growth, net of farm proprietors' income and adjusted for inflation.

The weaker economy in 1990 will also be reflected in a softening of labor markets. Total nonfarm establishment employment will increase 2.5 percent in 1990, compared to 2.9 percent in 1989; employment growth will be greatest during the first half of the year, slowing somewhat in the third and fourth quarters. Total civilian employment will grow only 1.0 percent this year, compared to 2.0 percent last year, but since the civilian labor force will grow 1.2 percent this year, the unemployment rate will increase from 5.2 percent in 1989 to 5.4 percent in 1990. Private nonfarm wage rates are expected to increase 5.4 percent, slightly less than the 1989 increase of 5.8 percent. Figure 7 shows U.S. and Kansas nonfarm wage and salary employment growth.

The Kansas Economy

The Kansas economy will also grow more slowly in 1990 than it did in 1989. Total nonfarm wage and salary employment, which we believe that we forecast more accurately than total employment,[4] will grow 1.7 percent this year compared to roughly 3.0 percent per year during the last two years. The total number of Kansans employed is expected to increase 1.3 percent, roughly the same rate of increase as in the past two years, but well below the 3.1 percent increase in 1987. The civilian labor force is expected to grow 1.5 percent this year; as a result, the unemployment rate will increase slightly, from 4.0 percent to 4.2 percent.

Figure 6
Real Personal Income Growth*



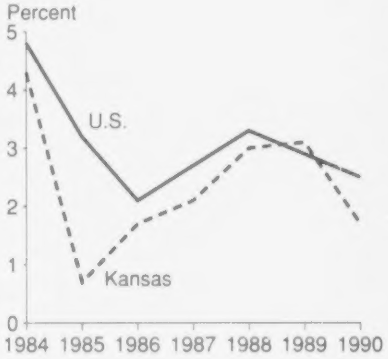
*Growth rate of U.S. and Kansas personal income (net of farm proprietors' income) deflated by the GNP consumption deflator.

Most of the growth in Kansas employment will come from three sectors: construction, trade, and services. Construction employment is expected to grow 8.6 percent from its depressed 1989 level; despite this impressive rebound, however, construction employment will still be 3.1 percent below its 1987 level. Employment in wholesale and retail trade will grow 2.0 percent, accounting for more than one-fourth of the growth in Kansas employment, while employment in services will increase 3.8 percent, accounting for nearly half of the total growth in Kansas employment.

Among other sectors of the Kansas economy that will show employment growth during the year are nondurable goods, f.i.r.e. (finance, insurance, and real estate), and transportation and public utilities. Employment in nondurable goods is expected to grow 3.0 percent after growing only 1.0 percent last year; most of this growth will come from employment growth in food and kindred products (3.1 percent) and printing and publishing (4.1 percent). Employment in f.i.r.e. will grow 2.0 percent, compared to 0.7 percent in 1989. Employment in transportation and utilities will grow 1.9 percent compared to 3.0 percent in 1989; a 5.3 percent decrease in railroad employment will be more than offset by a 4.5 percent increase in employment in trucking and warehousing.

Among the weaker sectors of the Kansas economy in terms of 1990 employment growth will be durable goods, mining, and government. Employment in durable goods manufacturing is expected to decrease 1.5 percent during 1990, with much of the decrease coming from an expected 3.6 percent decrease in employment in the manufacture of transportation equipment and a 2.7 percent decrease in the employment in fabricated metals; these employment reductions will be partly offset by a 1.7 percent increase in employment in the manufacture of machinery. Mining employment will increase a modest 1.6 percent, as the outlook for the oil and gas industry continues to be uncertain. State and local government employment will fall slightly (1.0 percent) following a 3.6 percent increase in 1989, while federal government employment in Kansas will fall 1.1 percent, after increasing 0.9 percent last year. Table 1 shows the forecasted growth rates in employment for several major Kansas sectors.

Figure 7
Nonfarm Wage and Salary Employment Growth



Kansas personal income in current dollars is expected to grow 8.3 percent in 1990, substantially faster than the meager 3.5 percent rate of growth in 1989. Adjusted for inflation, the 1990 rate of growth becomes 2.7 percent, compared to a decrease of 0.9 percent in 1989. This contrast between 1990 and the previous year, however, is not so much a reflection of an improved state of health for the overall Kansas economy, but rather a reflection of a rebound of farm personal income from its drastic fall in 1989. In nominal terms, farm income fell from $1.2 billion in 1988 to just over $0.2 billion in 1989 and is expected to increase to just over $0.9 billion in 1990. If we look at personal income net of farm proprietors' income, we find that the expected increase in current dollars is 6.6 percent, compared to 6.3 percent in 1989; if we go further and adjust for inflation, we find that nonfarm personal income is expected to grow only 1.0 percent in

Table 1
Kansas Employment Growth

	1988	1989	1990
Mining	-8.1	-10.0	1.6
Construction	-8.2	-2.7	8.6
Durable goods manufacturing	3.8	2.2	-1.5
Nondurable goods manufacturing	2.1	1.0	3.0
Transportation and Utilitites	2.3	3.0	1.9
Wholesale trade	2.3	0.7	2.0
Retail trade	4.1	3.2	1.9
Finance insurance and real estate	1.7	0.7	2.0
Services	6.2	7.4	3.8
Federal government	4.0	0.9	-1.1
State and local government	2.5	3.6	-1.0
Farm	1.6	3.1	7.3

1990, compared to 1.9 percent in 1989. Figure 6 shows Kansas and U.S. nonfarm personal income growth adjusted for inflation.

Conclusion

Although the forecast for the national and Kansas economies calls for curtailed growth in 1990, we do not expect a recession this year. National economic growth depends upon continued healthy export growth, as well as reasonably strong growth in business expenditures on plant and equipment, but weaker growth of consumer spending during the second half of the year will put the economy in a somewhat vulnerable position, for there will be a very small buffer zone to absorb negative shocks to either exports or business investment spending. The Federal Reserve Board's cautious approach in the face of continuing inflationary pressures will also contribute to slow growth during the second half of the year. As to the state, any shock that would cause the national economy to falter would be transmitted to a Kansas economy that is also growing slowly; on the other hand, the Kansas economy will be buoyed by a rebound in farm income during 1989. Although a severe downturn is not our choice as the most likely scenario, there is some possibility that such a downturn could occur.

Notes

1. The forecasts for the national economy are produced by the Econometric Model of the United States developed using assumptions generated at the Institute. This model was developed at the Center for Econometric Model Research at the University of Indiana. The directors of the CEMR are R. Jeffery Green and Morton J. Marcus. The Kansas forecasts are produced by the Kansas Econometric Model, which is a product of the Institute for Public Policy and Business Research at the University of Kansas.

2. Organization for Economic Cooperation and Development. Member nations are Australia, Austria, Belgium, Canada, Denmark, Finland, France, West Germany, Greece, Holland, Iceland, Ireland, Italy, Japan, Luxembourg, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

3. Trade weighted average of the dollar's exchange rate.

4. Total nonfarm wage and salary employment is a measure of jobs in Kansas firms; total employment is a measure of the number of Kansas residents who are employed. The latter measure is constructed from the former by estimating the adjustments needed to correct for people who are self-employed, for people who hold more than one job, and for those who live in Kansas and work out of state as well as those who live out of state and work in Kansas. For this reason, we feel that the measure of total jobs in Kansas is more accurate than the measure of total number of Kansans employed, and that we can forecast the total number of jobs better than we can forecast the number employed.

14th Annual

ECONOMIC OUTLOOK CONFERENCE

October 19, Kansas Union, The University of Kansas

Traditionally the focus of the Annual Economic Outlook Conference has been on the state's economic conditions and forecasts and on state economic policy issues. This year's theme continues that tradition and also transcends state boundaries to consider the globalization of world economies and the implications for state economics, economic development policies, and for Kansas business firms.

The *14th Annual Economic Outlook Conference*'s keynote speaker will be Dennis Kloske, Undersecretary for Export Administration, U.S. Department of Commerce, Washington D.C. Mr. Kloske will discuss challenges and trends in global business patterns and how these affect the U.S. trade position and the Midwest.

The primary theme for the morning session will be addressed by Douglas Ross, President of the Corporation for Enterprise Development, Washington, D.C. Mr. Ross will use his *1990 Economic Development Report Card for the States* as a basis for discussion and will focus on where Kansas stands in comparison with other states in the areas of economic performance, business vitality, development capacity, and state policy.

In the opening session of the Conference, Professor Norman Clifford will present the Institute's national and state economic forecasts for 1991, and Professor Tony Redwood will review progress in implementing the state's economic development strategy since it was devised in 1986, and review competing economic development strategies of other states.

The afternoon sessions will address subjects of vital concern and interest to the people of Kansas by focusing on the issues of international trade opportunities and on Kansas tax issues. The international perspective is extended by Hideo Kanemitsu, Professor of Economics from Sophia University, in Tokyo, and Consultant to the Central Bank of Japan. Discussion will center around actual experiences of exporting with Japan, problems and opportunities, and the cultural and social aspects of such trade arrangements.

The second session will address the issue of the Kansas tax structure and whether it stimulates or hinders state development. Kansas Inc. recently commissioned two research studies on Kansas taxes, one relating to the Kansas tax classification and reappraisal issue, and the other a comparison of the Kansas tax structure with other states within the region. These two reports will serve as a basis for discussion in this session and will be moderated by Charles Warren, President of Kansas Inc.

The Annual Economic Outlook Conference has become an important forum for discussion of major issues affecting Kansas. It enjoys the sponsorship of Kansas's leading business and government organizations and the participation of high-ranking governmental, educational, and business people as the moderators, guest speakers, panelists and registrants. The quality and timeliness of the programs in this series, and the opportunities for formal and informal contacts among participants have been keys to this event's continued success.

For More Information Contact: Bev Bray or Beth Huerter, Institute for Public Policy and Business Research, (913) 864-3701.

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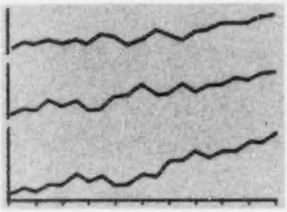
No. 179b **Business Taxes in Kansas and Nearby States, Vol. 1: Overview of State and Local Taxes in the Region*, Pat Oslund, Mohamed El-Hodiri, and Anthony Redwood (August 1990) $15.00

No. 179c **Business Taxes in Kansas and Nearby States, Vol. 2: Results from a Tax Simulation Model*, Pat Oslund, Mohamed El-Hodiri, and Anthony Redwood (August 1990) $15.00



Economic Indicators

Comparison Indicators

					% Change From	
	Quarter or Month	Current Period	Previous Period	Year Ago	Previous Period	Year Ago
A. Personal Income - Annual rates, SA						
Kansas - Mil. $	4th	41997	40251	40425	4.34	3.89
United States - Bil.$	1st	4638.03	4535.30	4317.77	2.27	7.42
B. Employment						
Kansas - Thou., NSA	1st	1231.83	1231.32	1205.99	0.04	2.14
United States - Mil., SA	1st	118.08	117.77	116.81	0.26	1.08
C. Unemployment Rate						
Kansas - % NSA	1st	4.2	3.9	4.9		
United States - % SA	1st	5.3	5.3	5.2		
D. Retail Sales - Annual rates						
Kansas - Mil. $, NSA	1st	20237.37	18705.12	17854.49	8.19	13.35
United States - Bil. $, SA	1st	1797.31	1749.55	1697.94	2.73	5.85
E. Consumer Price Index-U, All items, SA						
Kansas City* - 1982-1984 = 100	JUL-DEC	122.60	120.60	118.40	1.66	3.55
United States - 1982-1984 = 100	JUL-DEC	125.83	124.17	121.13	1.34	3.88

Kansas Indicators

F. New Incorporations, NSA						
For Profit - Number	1st	1195	1159	1131	3.11	5.66
G. Tax Revenue, NSA						
General Fund Tax Revenue - Mil. $	1st	498.56	536.65	494.05	-7.10	0.91
H. Operating Expenditures, NSA						
General Fund Operating Expenditures - Mil. $	1st	554.85	588.19	510.57	-5.67	8.67

* The Kansas City CPI-U is published semi-annually with the first period being January through June average and the second period being July through December average. National employment and unemployment rate figures are based on the Current Population Survey (household survey). State figures are based on the Current Employment Statistics Survey (establishment survey).

NSA-Not seasonally adjusted.

SA-seasonally adjusted.

SOURCES: BEA, BLS, Ks. Dept. of Human Resources, Ks. Secretary of State, Ks. Dept. of Administration, Ks. Dept. of Revenue.

National Indicators*

General Indicators	Quarter or Month	Current Period	Previous Period	Year Ago	% Change From Previous Period	% Change From Year Ago
A. Income Measures, Annual Rates						
Gross National Product - Bil. 82$	1st	4188.00	4174.10	4106.80	0.33	1.98
Disposable Personal Income - Bil. 82$	1st	2952.93	2936.90	2881.60	0.55	2.48
Personal Consumption - Bil. 82$	1st	2709.60	2693.70	2641.00	0.59	2.60
Gross Private Investment - Bil. 82$	1st	702.10	717.30	721.10	-2.12	-2.63
Net Export of Goods and Serv. - Bil. 82$	1st	-40.40	-47.20	-55.00		
Government Purchases - Bil. 82$	1st	816.70	810.40	799.70	0.78	2.13
Savings Rate - %	1st	5.53	5.50	5.40		
B. Labor Force						
Civilian Labor Force - Mil.	MAR	124.83	124.63	123.25	0.16	1.29
Employed - Mil.	MAR	118.33	118.04	117.05	0.25	1.10
Unemployed - Mil.	MAR	6.50	6.59	6.20	-1.50	4.79
Unemployment Rates - percent						
All	MAR	5.20	5.30	5.00		
Women	MAR	5.30	5.40	5.20		
Men	MAR	5.10	5.20	4.90		
Teens	MAR	14.40	14.80	14.00		
Blacks and other than white	MAR	9.40	9.20	9.80		
Whites	MAR	4.50	4.60	4.30		
C. General Business						
Industrial Production - 1977 = 100	1st	108.37	108.13	107.67	0.22	0.65
Manufacturing and Trade Sales - Bil. 82$	4th	1397.80	1399.50	1390.60	-0.12	0.52
Manufacturing and Trade Inventories - Bil. 82$	4th	2108.68	2093.01	2052.60	0.75	2.73
New Orders, Durable Goods - Bil. 82$	1st	307.23	323.59	322.41	-5.06	-4.71
Capacity Utilization, Mfg. %	4th	83.00	84.00	84.40	-1.19	-1.66
New Housing Starts, Private - Thou.	1st	4377.00	4043.00	4518.00	8.26	-3.12
D. Prices						
Consumer Prices - 1982-1984 = 100						
CPI-U, All Items	MAR	128.90	128.30	122.50	0.47	5.22
Food	MAR	131.50	131.10	123.50	0.31	6.48
Housing	MAR	126.90	126.30	121.60	0.48	4.36
Apparel	MAR	124.90	122.90	118.80	1.63	5.13
Transportation	MAR	117.60	117.70	112.60	-0.08	4.44
Medical	MAR	158.50	157.30	145.90	0.76	8.64
Producer Prices - 1982-1984 = 100 (NSA)						
All Commodities	MAR	114.20	114.40	111.50	-0.17	2.42
Industrial Commodities	MAR	113.20	113.60	110.50	-0.35	2.44
Crude Materials	MAR	105.60	106.90	103.20	-1.22	2.33
Capital Equipment	MAR	121.80	121.40	117.50	0.33	3.66
Agricultural Prices - 1977 = 1000						
Prices Received	MAR	150.00	152.00	150.00	-1.32	0.00
Prices Paid	MAR	181.00	181.00	175.00	0.00	3.43
E. Monetary and Credit Aggregates**						
Total Reserves	1st	2.40	5.10	-3.10		
M1	1st	4.80	5.10	-0.1		
Commercial Banks						
Savings	1st	9.60	7.10	-5.50		
Small Denomination Time	1st	7.90	11.30	22.40		
Large Denomination Time	1st	-1.40	2.70	16.50		
Thrift Institutions						
Savings	1st	1.20	0.30	-7.70		
Large Denomination Time	1st	-25.10	-28.60	0.70		
Debt Components						
Federal	1st	8.20	9.50	7.70		
Nonfederal	1st	6.00	7.40	8.30		
Interest Rates - Monthly						
Prime Rate - %	MAR	10.00	10.00	11.50		
Discount Rate - %	MAR	7.00	7.00	7.00		

* Seasonally Adjusted
** Annual rates of change, seasonally adjusted in percent.

SOURCES: BEA, BLS, Survey of Current Business, Federal Reserve Bulletin.

Quarterly Employment in Kansas

	1990	1989	1989	% Change From	
				1989	1989
	Q1	Q4	Q1	Q4	Q1
A. General Indicators					
Civilian Labor Force - Thou.	1285.45	1279.86	1263.53	0.44	1.73
Employed - Thou.	1231.83	1231.32	1205.99	0.04	2.14
Farm Employment - Thou.	60.73	61.37	48.87	-1.03	24.28
Unemployed - Thou.	53.62	48.55	57.54	10.45	-6.82
Initial Claims for Unemployment Insurance - Thou.	14.89	17.86	15.84	-16.62	-6.00
Average Work Week, Manufacturing - Hrs.	39.97	39.00	40.70	2.48	-1.80
B. Industry Employment, in thousands					
All Industries	1076.77	1086.67	1042.83	-0.91	3.25
Manufacturing	184.23	184.90	183.27	-0.36	0.53
Durable Goods	107.43	109.33	108.27	-1.74	-0.77
Fabricated Metal Production	10.70	10.53	11.37	1.58	-5.87
Machinery (including Electrical)	29.00	28.80	28.07	0.69	3.33
Transportation Equipment	48.57	50.40	49.30	-3.64	-1.49
Nondurable Goods	76.80	75.57	75.00	1.63	2.40
Food and Kindred Products	27.07	26.97	26.90	0.37	0.62
Meat Products	14.63	14.63	14.80	0.00	-1.13
Printing and Publishing	20.67	19.80	19.50	4.38	5.98
Petroleum and Coal	11.93	11.47	11.77	4.07	1.42
Mining	9.40	9.33	9.23	0.71	1.81
Oil and Gas Extraction	8.20	8.07	8.13	1.65	0.82
Contract Construction	38.67	42.03	35.03	-8.01	10.37
Transportation and Public Utilities	65.97	66.53	64.97	-0.85	1.54
Wholesale Trade	70.03	69.60	68.27	0.62	2.59
Retail Trade	197.57	202.80	190.90	-2.58	3.49
Finance, Insurance, and Real Estate	58.87	58.47	57.33	0.68	2.67
Services	234.80	234.83	222.23	-0.01	5.65
Federal Government	29.37	29.53	29.30	-0.56	0.23
State and Local Government	187.87	188.63	182.30	-0.41	3.05

SOURCES: BLS, Ks. Dept. of Human Resources.

Quarterly Kansas Retail Sales Subject to Sales Tax*

	1990	1989	1989	% Change From	
				1989	1989
	Q1	Q4	Q1	Q4	Q1
Sales, in Millions					
Apparel	598.35	476.83	535.47	25.49	11.74
Automotive	3105.29	3256.82	2988.39	-4.65	3.91
Food	4587.26	4452.10	4374.95	3.04	4.85
Furniture	1118.68	899.64	942.62	24.35	18.68
General Merchandise	3699.99	3014.93	3378.92	22.72	9.50
Lumber and Building Materials	1267.97	1432.70	1182.52	-11.50	7.23
Professional and Personal Services	1624.93	1536.53	1178.30	5.75	37.90
Public Utilities	509.56	416.73	779.03	22.28	-34.59
Unclassified	1618.56	1503.47	1531.55	7.66	5.68
Farm and Garden Products	29.73	25.42	29.46	16.93	0.91
Manufacturing and Trading	873.33	949.09	906.80	-7.98	-3.69
Miscellaneous	13.29	5.25	26.47	153.32	-49.78
Total	19046.93	17969.50	17854.49	6.00	6.68

NOTE: Retail sales figures are based on sales tax collections. Actual and reported retail sales may vary.

* Annual Rates

SOURCE: Ks. Dept. of Revenue.

Quarterly Personal Income in Kansas*

				%Change From	
	1989	1989	1988	1989	1988
	Q4	Q3	Q4	Q3	Q4
A. Personal Income					
Total - Mil. $	41997	40251	40425	4.34	3.89
Nonfarm Income - Mil. $	40975	40530	38800	1.10	5.61
Farm Income - Mil. $	1022	-279	1625	--	-37.11
Average Weekly Earnings, Mfg.** - $	412	414	427	-0.56	-3.44
B. Earnings by Industry, in Millions					
Nonfarm	27591	27451	26541	0.51	3.96
Farm	1022	-279	1625	--	-37.11
Manufacturing	5239	5504	5309	-4.81	-1.32
Durable Goods	3145	3481	3371	-9.65	-6.70
Nondurable Goods	2095	2023	1938	3.56	8.10
Mining	298	299	292	-0.33	2.05
Contract Construction	1539	1501	1594	2.53	-3.45
Transportationand Public Utilities	2399	2377	2276	0.93	5.40
Wholesale Trade	2079	2022	1931	2.82	7.66
Retail Trade	2739	2727	2670	0.44	2.58
Finance, Insurance, and Real Estate	1698	1632	1633	4.04	3.98
Services	6307	6206	5803	1.63	8.69
Federal Government	915	906	848	0.99	7.90
State and Local Government	718	709	688	1.27	4.36

*Seasonally adjusted, at annual rates
**Not seasonally adjusted.

SOURCES:BEA, Ks. Dept. of Human Resources.

Monthly Kansas Agricultural Indicators*

				% Change From	
	1990	1990	1989	1990	1989
	March	February	March	February	March
Prices Received					
All Farm Products - 1977 = 100	181	180	185	0.56	-2.16
All Crops - 1977 = 100	142	143	163	-0.70	-12.88
Wheat - $/Bu.	3.49	3.57	4.02	-2.24	-13.18
Sorghum Grain - $/Bu.	3.65	3.49	3.87	4.58	-5.68
Corn - $/Bu.	2.32	2.26	2.60	2.65	-10.77
Soybeans - $/Bu.	5.45	5.34	7.17	2.06	-23.99
All Hay - $/Ton	74.00	79.00	76.00	-6.33	-2.63
Livestock and Products - 1977 = 100	205	204	198	0.49	3.54
All Beef Cattle - $/Cwt.	78.10	77.60	77.20	0.64	1.17
Steers and Heifers - $/Cwt.	79.20	78.80	79.70	0.51	-0.63
Calves - $/Cwt	98.40	95.30	91.40	3.25	7.66
Hogs - $/Cwt.	50.50	47.70	38.20	5.87	32.20
Milk - $/Cwt.	13.50	14.50	12.40	-6.90	8.87

* Not seasonally adjusted.

SOURCE: Ks. Crop and Livestock Reporting Service.

Quarterly Employment and Sales for SMSAs and Counties

Area	1990 Q1	1989 Q4	1989 Q1	% Change From 1989 Q4	% Change From 1989 Q1
A. Wichita SMSA					
Civilian Labor Force - Thou.	254.10	258.75	258.98	-1.80	-1.89
Employed - Thou.	243.59	247.32	246.71	-1.51	-1.26
Unemployed - Thou.	10.50	11.44	12.27	-8.16	-14.43
Rate - %	4.13	4.43	4.73		
Retail Sales - Mil. $	998.37	916.39	941.40	8.95	6.05
B. Kansas Portion of Kansas City SMSA					
Civilian Labor Force - Thou.	336.65	323.77	330.21	3.98	1.95
Employed - Thou.	322.36	311.60	313.79	3.45	2.73
Unemployed - Thou.	14.29	12.10	16.43	17.44	-13.00
Rate - %	4.27	3.77	4.97		
Retail Sales - Mil. $	1157.75	1050.53	1063.81	10.21	8.83
C. Topeka SMSA					
Civilian Labor Force - Thou.	92.85	90.30	93.32	2.82	-0.50
Employed - Thou.	88.88	86.77	88.70	2.43	0.20
Unemployed - Thou.	3.98	3.54	4.62	12.37	-13.89
Rate - %	4.27	3.90	4.93		
Retail Sales - Mil. $	346.57	312.93	324.17	10.75	6.91
D. Lawrence SMSA					
Civilian Labor Force - Thou.	43.50	42.07	41.73	3.39	4.23
Employed - Thou.	42.03	40.81	40.10	3.00	4.81
Unemployed - Thou.	1.47	1.26	1.63	16.16	-9.98
Rate - %	3.37	3.00	3.90		
Retail Sales - Mil. $	127.41	121.38	114.58	4.97	11.20
E. Riley County--Manhattan Area					
Civilian Labor Force - Thou.	28.60	28.71	28.76	-0.37	-0.55
Employed - Thou.	27.71	27.79	27.71	-0.27	0.01
Unemployed - Thou.	0.89	0.92	1.05	-3.31	-15.44
Rate - %	3.10	3.20	3.63		
Retail Sales - Mil. $	50.15	44.69	63.09	12.22	-20.51
F. Reno County--Hutchinson Area					
Civilian Labor Force - Thou.	31.03	30.19	30.92	2.81	0.38
Employed - Thou.	29.64	28.92	29.15	2.49	1.70
Unemployed - Thou.	1.39	1.26	1.77	10.17	-21.29
Rate - %	4.50	4.20	5.73		
Retail Sales - Mil. $	110.19	101.54	104.76	8.52	5.18
G. Crawford County--Pittsburg Area					
Civilian Labor Force - Thou.	17.76	16.98	16.72	4.62	6.24
Employed - Thou.	16.87	16.19	15.70	4.19	7.46
Unemployed - Thou.	0.89	0.78	1.02	13.51	-12.55
Rate - %	5.03	4.60	6.07		
Retail Sales - Mil. $	47.17	45.91	44.60	2.73	5.76
H. Lyon County--Emporia Area					
Civilian Labor Force - Thou.	19.81	19.37	19.89	2.28	-0.40
Employed - Thou.	18.93	18.58	18.76	1.91	0.92
Unemployed - Thou.	0.88	0.79	1.13	10.98	-22.34
Rate - %	4.43	4.07	5.67		
Retail Sales - Mil. $	54.86	50.72	50.36	8.16	8.93
I. Saline County--Salina Area					
Civilian Labor Force - Thou.	27.99	26.71	27.77	4.77	0.76
Employed - Thou.	26.86	25.67	26.25	4.62	2.31
Unemployed - Thou.	1.13	1.04	1.52	8.43	-25.87
Rate - %	4.03	3.90	5.50		
Retail Sales - Mil. $	108.42	101.38	104.02	6.95	4.23
J. Barton County--Great Bend Area					
Civilian Labor Force - Thou.	14.12	14.21	14.50	-0.61	-2.60
Employed - Thou.	13.55	13.70	13.74	-1.08	-1.37
Unemployed - Thou.	0.58	0.51	0.76	11.87	-24.61
Rate - %	4.07	3.63	5.27		
Retail Sales - Mil. $	62.89	56.60	57.99	11.13	8.45
K. Montgomery County--Coffeyville Area					
Civilian Labor Force - Thou.	17.82	17.78	17.96	0.27	-0.75
Employed - Thou.	16.84	16.92	16.90	-0.47	-0.32
Unemployed - Thou.	0.98	0.85	1.06	15.06	-7.54
Rate - %	5.50	4.80	5.93		
Retail Sales - Mil. $	54.23	52.59	52.79	3.11	2.73

SOURCES: Ks. Dept. of Human Resources, Ks. Dept. of Revenue.

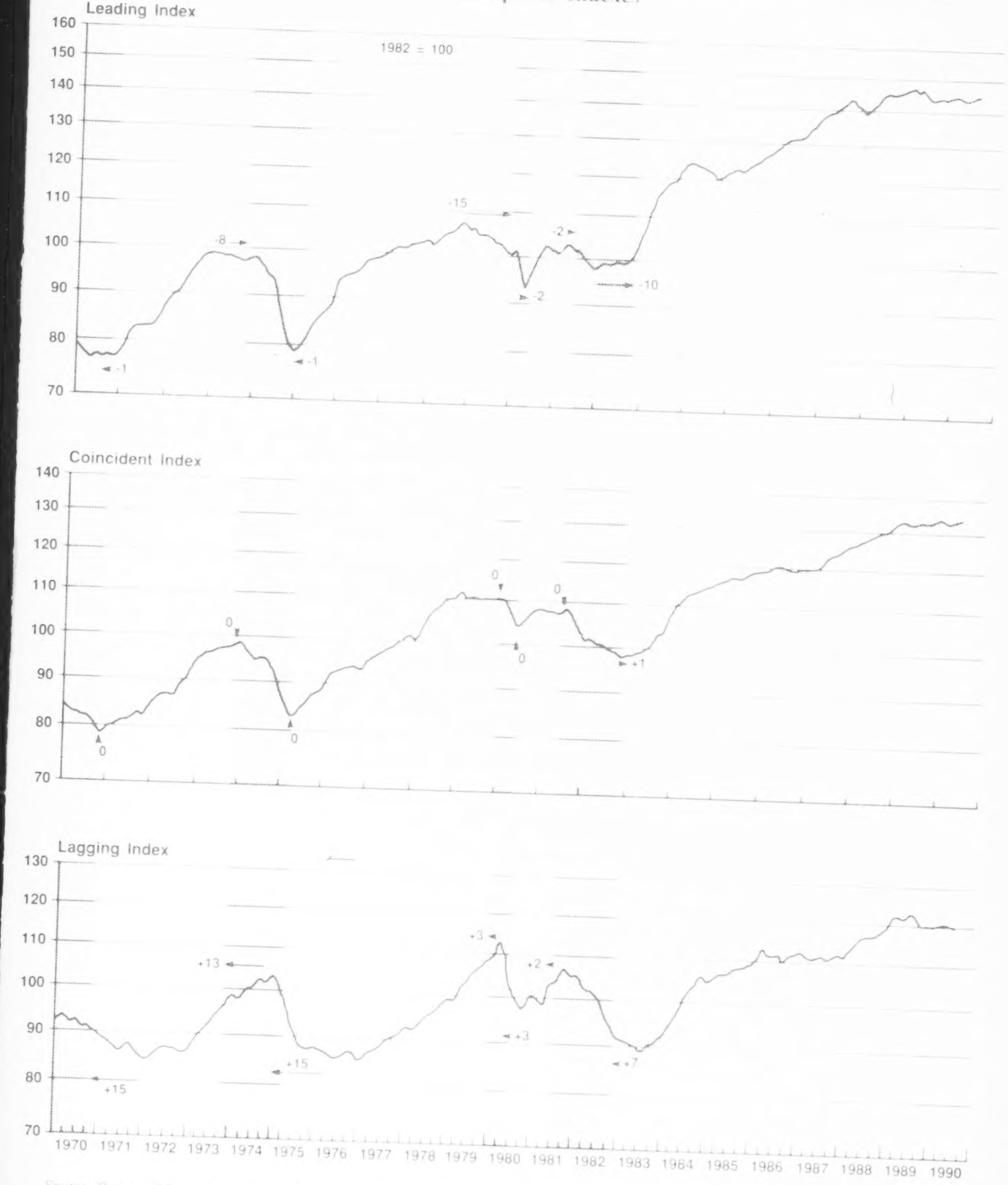
Quarterly Banking and Savings and Loan Activity in Kansas*

	1990 Q1	1989 Q4	1989 Q1	% Change From 1989 Q4	% Change From 1989 Q1
Federal Reserve Member Banks					
A. Kansas, in Millions					
Total Deposits	38162.0	38786.7	37909.2	-1.61	0.67
Total Checkable	6320.3	6197.0	6273.9	1.99	0.74
Demand Deposits	3007.3	3012.7	3035.4	-0.18	-0.93
Other Checkable	3313.0	3184.3	3238.1	4.04	2.31
Small Time and Savings	25890.0	26340.7	25111.8	-1.71	3.10
Large Time	5951.7	6249.0	6509.3	-4.76	-8.57
B. Kansas City, KS, in Millions					
Total Loans	1738.14	1767.45	1761.04	-1.66	-1.30
Real Estate	964.86	984.72	951.23	-2.02	1.43
Commercial and Industrial	507.18	515.92	533.63	-1.69	-4.96
Consumer	97.63	95.78	100.79	1.94	-3.13
Total Deposits	2188.53	2117.17	2041.89	3.37	7.18
Demand Deposits	199.44	204.79	219.68	-2.61	-9.21
Time and Savings	1282.00	1220.38	1163.55	5.05	10.18
C. Topeka, in Millions					
Total Loans	409.25	404.77	387.68	1.11	5.56
Real Estate	146.21	143.49	122.78	1.89	19.08
Commercial and Industrial	128.95	127.42	140.67	1.20	-8.33
Consumer	74.00	75.09	70.65	-1.45	4.74
Total Deposits	573.64	558.53	536.18	2.71	6.99
Demand Deposits	146.06	146.05	165.34	0.01	-11.66
Time and Savings	267.11	263.77	234.88	1.26	13.72
D. Wichita, in Millions					
Total Loans	1469.44	1415.90	1368.20	3.78	7.40
Real Estate	318.80	316.44	296.29	0.75	7.59
Commercial and Industrial	474.71	467.95	493.97	1.45	-3.90
Consumer	511.82	473.48	414.15	8.10	23.58
Total Deposits	2135.35	2085.19	1985.13	2.41	7.57
Demand Deposits	464.56	459.46	463.45	1.11	0.24
Time and Savings	1134.30	1090.79	1048.03	3.99	8.23

* The data above pertain only to Federal Reserve member banks of Kansas and do not represent all commercial banking in the state. Since 1980, these data have covered approximately 50 percent of the state's banking activity.

SOURCES: Federal Reserve Bank of Kansas City, Federal Home Loan Bank of Topeka.

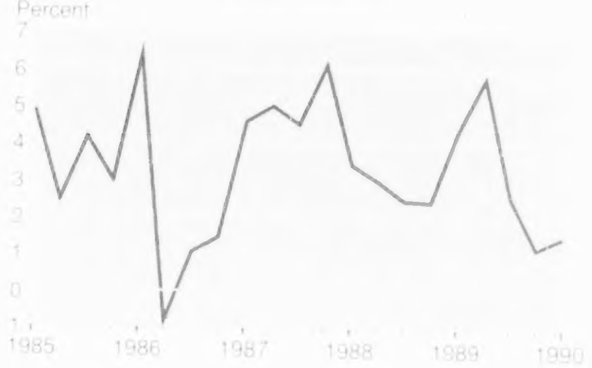
U.S. Composite Indexes



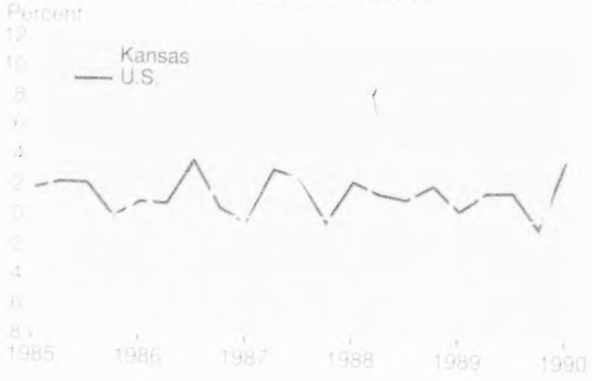
Source: Bureau of Economic Analysis, *Business Conditions Digest*.

Note: Numbers entered on the chart indicate length of leads [illegible] and lags [illegible] months from reference turning dates. Shading indicates periods of recession.

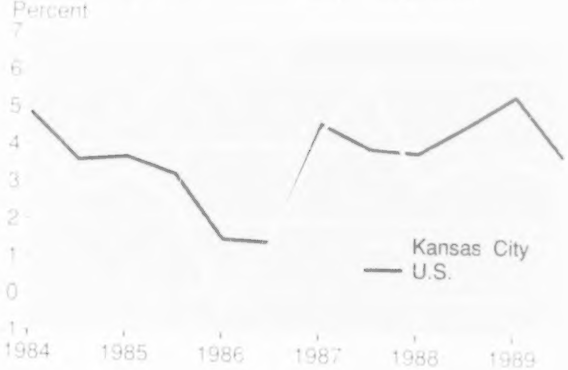
Average Annual Growth Rate of GNP
(1982 Dollars)



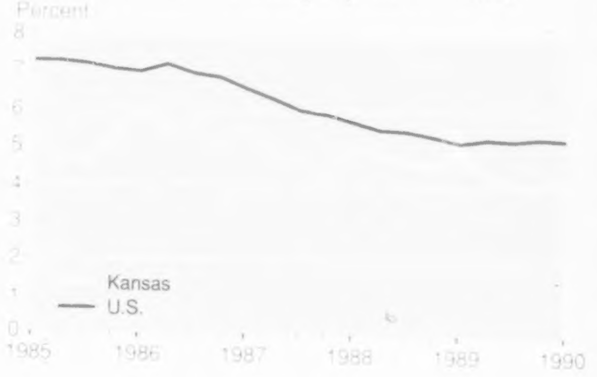
Growth of Retail Sales
(In Current Dollars)



Rate of Inflation
(CPU-I, Seasonally Adjusted)



Civilian Unemployment Rate



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